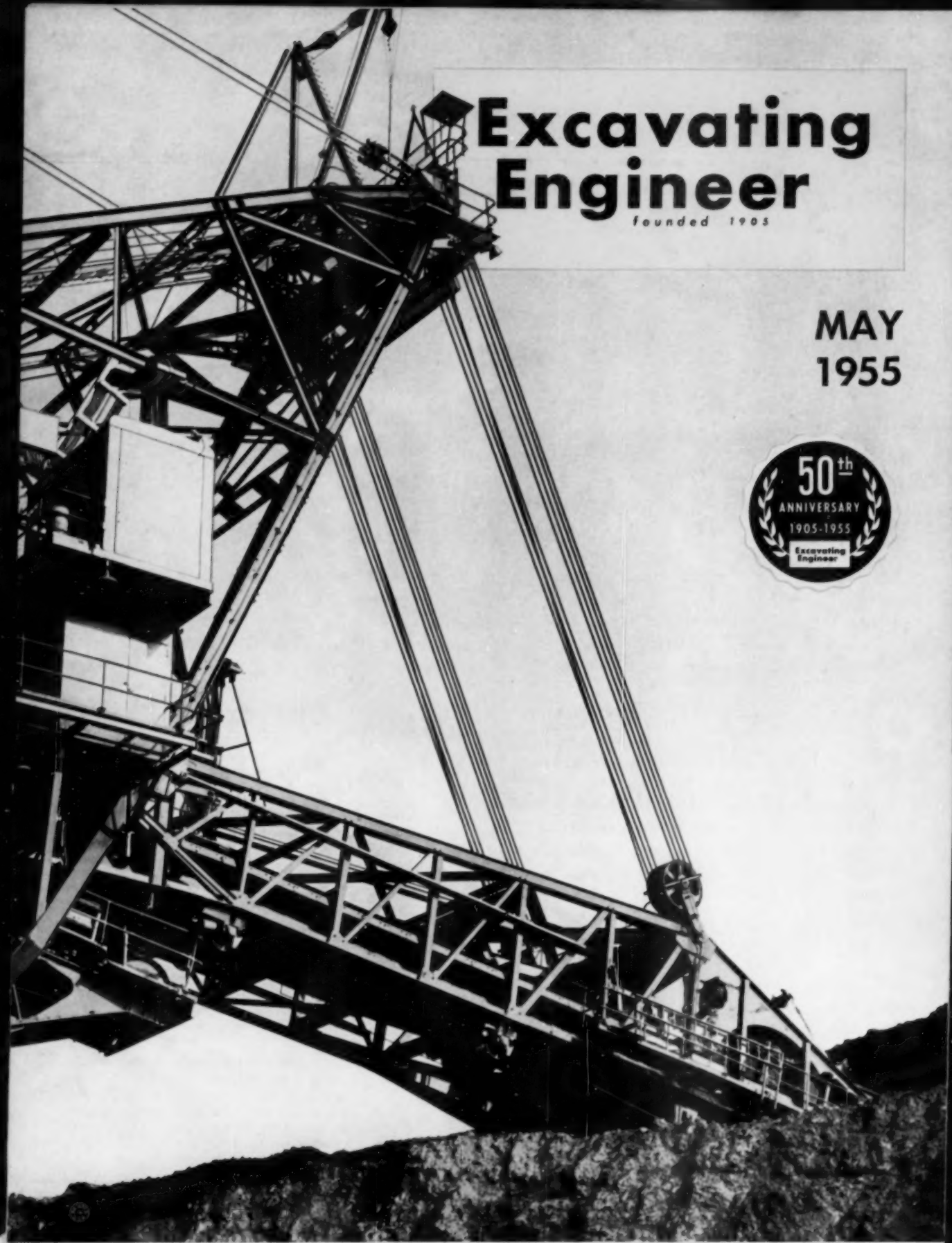
Excavating Engineer

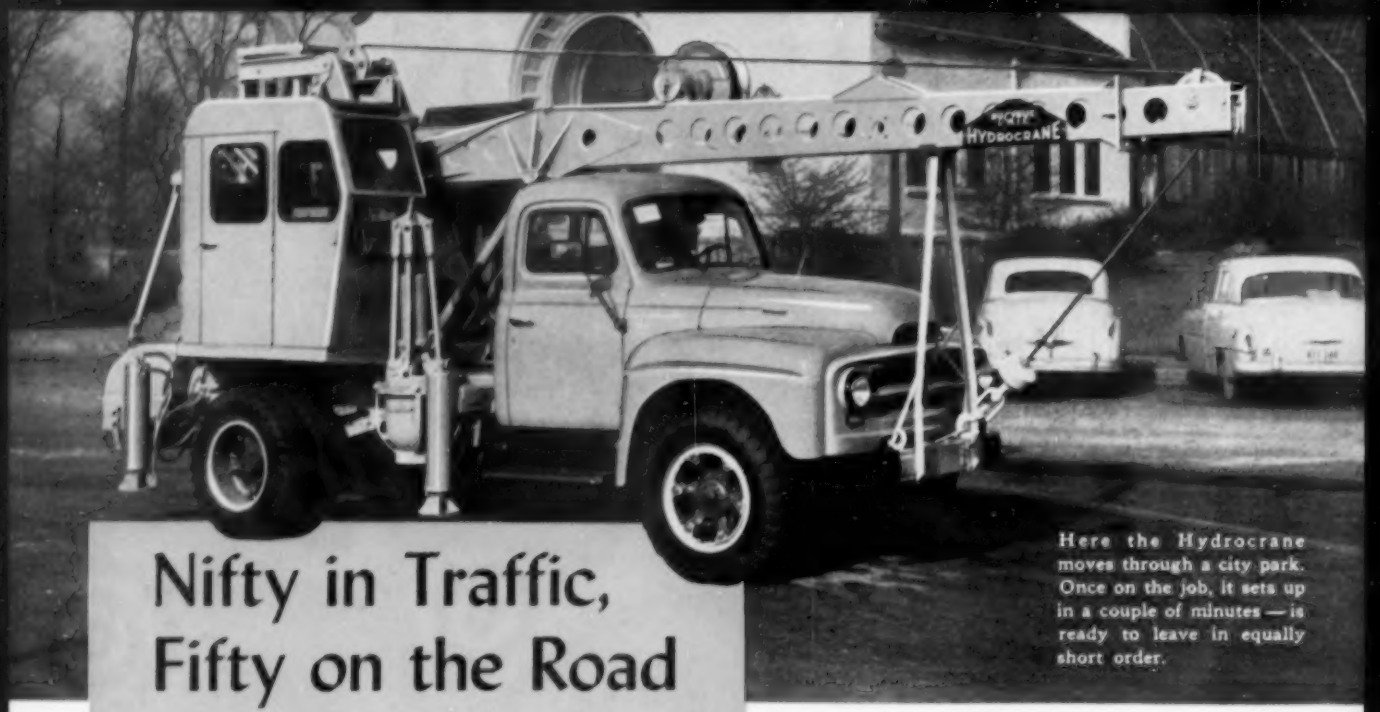
founded 1905

MAY
1955

50th ANNIVERSARY
1905-1955
Excavating Engineer



Here, in an Illinois coal field, is the business end of a brand-new wheel excavator. The big machine cuts down deep overburden, leaving it at a depth which makes easy work for a stripping shovel. Turn to page 21 for article, with pictures, on wheel excavator.



Nifty in Traffic, Fifty on the Road

Here the Hydrocrane moves through a city park. Once on the job, it sets up in a couple of minutes — is ready to leave in equally short order.

Hydrocrane turns overhead into output

The quicker you get there, the sooner you quit paying and start earning. That's why Hydrocrane-Hydrohoe owners appreciate the 50-mph travel speed of this compact traffic-master. Hydrocrane design makes this travel speed possible. Hydraulically operated outriggers relieve truck chassis of work strains on heavy lifts, permitting use of a lighter, faster truck—one that costs less to buy and maintain. Telescoping boom fits snugly over cab and rests on a strong rack instead of bobbing out behind.

No detours around low underpasses

Notice the Hydrocrane's low superstructure. You can drive it through underpasses with 12-ft. clearance. With such speed and agility in traffic the Hydrocrane or Hoe can handle a number of lifting or digging jobs at widely separated locations in a single day. And the compact size puts it way ahead on close quarter digging.

Owners like that speed

Travel speed is a big factor to most Hydrocrane users. One five-machine owner says, "Travel speed is important to us. It should not fall below 50 mph. If a rig doesn't travel at least 45 or 50, you're getting in the heavy, sluggish class."

Try it yourself

Ask your Hydrocrane distributor to demonstrate the smooth all-hydraulic Hydrocrane or Hoe on one of your digging or lifting jobs. Then get behind the wheel and drive it yourself. Find out how you can turn overhead time into output dollars. 57H55C

Smooth-trenching Hydrohoe is available with standard 18-in. dipper, or optional 12-in. narrow and 24-in. wide dippers. Wrist-action dipper can be rotated as it bites — provides up to 6 tons of tooth force. Quickly convertible to crane front end in field.

BUCYRUS ERIE
South Milwaukee Wisconsin

1880 75 1955
YEARS OF SERVICE to Men Who Shape the Earth

NEW YORK THRUWAY CONTRACTOR ORLANDO SHOWS . . .

how to keep your shovels busy

A. J. Orlando Contracting Co. of Whitestone, New York, won a sub-contract to excavate and move one million yards of earth and rock on the anchor end of the New York Thruway. The job had to be completed before snow and other winter conditions set in—and this meant fast stepping!

To keep cycle time down, dynamic Anthony Orlando set up schedules that would keep the shovels constantly busy with a minimum number of trucks. This was a job made to order for his fleet of Mack six-wheel dumpers, bolstered by five new Mack LJSW-X six-wheelers.

Despite heavy rains and unusually soft going, the contract was carried out at a rapid pace to a successful conclusion. Says President Orlando, "For jobs like this, Macks are the only trucks I can afford to operate."

Macks are the mainstays of many a contractor who must keep up fast and uninterrupted hauling schedules. The famous Mack Balanced Bogie provides sure-footed traction in soft or slippery going. And when it comes to shrugging off punishment, Macks are in a class by themselves.

Have your Mack branch or distributor show you why, like Mr. Orlando, you can't afford *not* to operate Macks.

MACK TRUCKS Empire State Building, New York 1, N. Y.

IN VENEZUELA . . . AND THE WORLD OVER

It's Bucyrus-Erie For the Tough Metal Mining Jobs

When the rich iron ore deposits of Cerro Bolivar mountain in Venezuela were discovered, Bucyrus-Erie 190-B shovels were selected to spearhead the job of excavation. Swinging 8-cu. yd. dippers, they keep a fleet of 20-cu. yd. carriers on the move.

The proved superiority of Bucyrus-Erie large-capacity excavators is the result of new front-end design, extra-strong construction, and advanced engineering throughout. Combined with the speed and smoothness of Ward Leonard electric control, these features offer performance that means higher output at the lowest cost per yard.

36L55C

Bucyrus-Erie Company

South Milwaukee, Wisconsin

Advertisers

IN THIS ISSUE

Allis-Chalmers Mfg. Co. 6, 42–43
American Manganese Steel Div., American Brake Shoe Co. 7
Bethlehem Steel Co. 12
Bucyrus-Erie Co. ..... Cover II, 2, 16, 64–65, 68
California Welding & Blacksmith Shop 56
Caterpillar Tractor Co. 17–18–19–20
Clark Equipment Co. 49
Colorado Fuel and Iron Corp. 4
Drake-Williams-Mount 57
Electric Steel Foundry Co. 53–54
Ensign-Bickford Co., The ..... Cover IV
Erie Strayer Co. 62
Euclid Div., General Motors Corp. 61
For Sale (Classified) 69
Foster, L. B. & Co. 62
General Motors Corp., Euclid Div. 61
Harnischfeger Corp. 47
Hayward Co., The 60
Hough Co., The Frank G. 59
Ingersoll-Rand Co. 66
International Harvester Co. 36-37
Leschen Wire Rope Div., H. K. Porter Co., Inc. ..... Cover III
Le-Tourneau-Westinghouse Co. 11, 13
Mack Motor Truck Corp. 1
M-R-S Manufacturing Co. 8–9
Northwest Engineering Co. 5
Porter, H. K. Co., Inc., Leschen Wire Rope Div. ..... Cover III
Roebling's Sons Corp., John A. 4
Sauerman Bros., Inc. 50
Shell Oil Co. 14–15
Westinghouse Air Brake Co. 51

Excavating Engineer

founded 1905

CONTENTS

Volume XLIX No. 5 **May, 1955**

Wheel Excavator: Coal Stripping Tool with a Future 21

The wheel excavator comes of age with Bucyrus-Erie's new machine. It is the first unit built from the ground up for wheel excavator service. Truax-Traer Coal Co. puts wheel to work.

Kiewit Solves Freeway Problems—by Ray Day 32

Contractor develops vertical auger rigs for hole excavation when successful bid lands Ramona Freeway job with its structure foundation problems. Speedy cast-in-place piles result.

Academy Project Begins Shortly 44

Construction of $125 million air force school at Colorado Springs, Colo., expected to begin in June. Oklahoma engineers run soil tests. Excavation may be completed by end of the year.

News from the Field 46

AGC Is Optimistic 46
Light Towers Speed Work 46
Big Dredges Moved 48
Trucks Tired Tubelessly 48
Van Zee Heads ICEI 48

Equipment You Ought to Know About 50

New Trade Literature 57

Notes from the Manufacturers 63

Not in the Contract 67

COPYRIGHT 1955 BY THE EXCAVATING ENGINEER PUBLISHING COMPANY

Regular Subscription (payable in advance): 35 cents per copy, $3.50 a year; Canada and foreign, subject to publication policy, $5.00 per year. Special subscription: Upon written request on company letterhead this publication will be sent free of charge to companies, executives and supervisors engaged actively in excavating. Occupation of subscriber must be given for all subscriptions, paid or special. Right is reserved to refuse foreign subscription. Indexed by Engineering Index, Inc. Volumes available on microfilm.

Published Monthly by

THE EXCAVATING ENGINEER PUBLISHING COMPANY

South Milwaukee, Wisconsin, U.S.A.

G. R. WENZEL, Editor
W. C. VAN DYKE, Managing Editor
M. B. JAEGER, Publisher
H. A. BURKHARDT, Manager

J. C. DeLONG, Assistant Editor
E. W. ARNDT, Art Editor
R. B. SAHS, Sales Manager

BPA Member

ROEBLING ANNOUNCES ITS NEW

Royal 1105 Blue

WIRE ROPE . . . 15% STRONGER THAN YESTERDAY'S GUARANTEED STRONGEST!

15% MORE STRENGTH is a whopping improvement. But translate that extra strength into terms of increased service life and you've really got something to brag about.

★ What's more, Roebling is pulling no punches on the variety of this new rope that will soon be available. You'll be able to get **ROYAL BLUE** Wire Rope in EVERY DIAMETER from ¼" to 3½" . . . in EVERY STANDARD CONSTRUCTION with an independent wire rope core.

★ In addition to new high strength, Roebling type 1105 wire — the finest high carbon rope wire ever produced — gives **ROYAL BLUE** Wire Rope amazing toughness and resistance to impact, crushing, abrasion and fatigue.

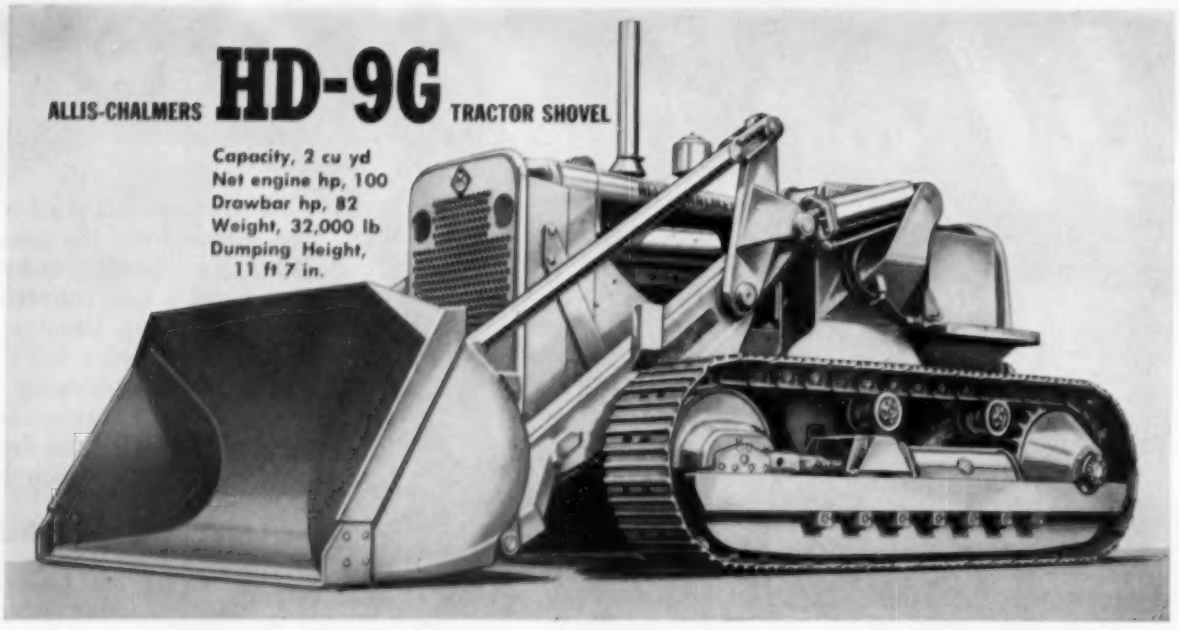
★ As the first step toward completely new service economy, write us for the whole story on **ROYAL BLUE** Wire Rope, or contact your distributor or nearest Roebling branch office.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13235 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

MODEL
41
A REAL 1 YD. RIG!
The Northwest Model 41 is built as a full 1 yd. Crane from the ground up. It brings you all the Northwest advantages and is fully convertible from Shovel to Crane, Dragline or Pullshovel. If you need a full 1 yd. machine, capable of delivering the service you have a right to expect from a 1 yd. rig, be sure to get full details on the Model 41 before you buy.
NORTHWEST ENGINEERING COMPANY
1506 Field Bldg., 135 South LaSalle St., Chicago 3, Illinois
NORTHWEST
SHOVELS • CRANES • DRAGLINES • PULLSHOVELS
YOU CAN'T HAVE
NORTHWEST ADVANTAGES
UNLESS YOU OWN A NORTHWEST

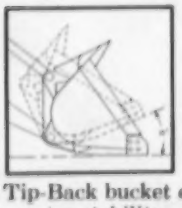


POPULAR 2-YD HD-9G TRACTOR SHOVEL NOW OFFERS

Higher Work Capacity

Design refinements in the Allis-Chalmers HD-9G now make it even more productive than ever. First, the net engine output has been increased to 100 hp, with 23,000 lb of push for extra crowding and digging ability, fast work cycles.

Streamlined bucket design now helps roll in large loads with less tractor effort. The back of the bucket has been brought forward and the sides extended to cut spillage, put more pay load where it's wanted. Cleaner dumping with the new bucket saves the operator time and effort shaking out loads.



A new addition to the wide variety of attachments available for the HD-9G Tractor Shovel is the Tip-Back bucket which allows the operator to roll the bucket back approximately 25° at ground level. Ideal for handling greater capacities of loose stockpiled materials, the Tip-Back bucket can be carried lower to the ground for greater stability . . . can load bulky objects easier.

New-type ceramic master clutch lining reduces lever pull, makes it easier for the operator to do more. The new HD-9G helps the operator do more in other ways, too — giving him full vision, fast and easy control, cleaner platform and more comfortable seat from which to work, and more working time with truck wheels, support rollers and idlers that need greasing only once every 1,000 hours.

Lower Operating Cost

Design improvements also add longer life to the HD-9G under all work conditions. Heavy box-section booms are 50 percent stronger, assuring proper alignment even working in the toughest materials. The low design of the new HD-9G combination stabilizer and cowl not only offers easy accessibility for maintenance and service, but contributes to maximum operator vision. New ceramic master clutch lining operates longer between adjustments, increases clutch life.

Hydraulic system provides new maintenance simplicity, safety of operation, as well as improved visibility. With new-style tank, there are few external fittings, greatly reducing possibility of outside leaks. Magnetic filters and suction-line screens protect the entire system from damaging grit. New, improved hydraulic pump is designed for long life as well as fast and accurate bucket action.

Heavy-duty truck wheels and idlers are available for particularly tough working conditions. One-piece, full-length main frame permits unit construction so that major assemblies can be removed without disturbing adjacent units, putting tractor back on the job in hours rather than days.

☆ ☆ ☆

See your Allis-Chalmers dealer for further information on what the HD-9G can do for you — or a demonstration right on your job.

ALLIS-CHALMERS
TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

Where parts must be

EXTRA TOUGH

specify AMSCO® MANGANESE STEEL

Amsco backhoe bucket at work

Digging! Crushing! Handling! Amsco manganese steel parts work up to 10 times longer under punishment . . . because manganese steel can easily absorb heavy impact and abrasion. Hard work toughens the metal . . . it work hardens to as high as 550 Brinell. The pounding, grating action of rock and ore only polishes manganese steel.

To get maximum life out of your equipment, specify Amsco manganese steel parts from the manufacturer.

DIGGING

backhoe buckets
dippers and parts
repointers
dragline buckets and parts
dragline chain
sheaves
pinions
crawler shoes

CRUSHING

concaves
mantles
jaw plates
mill liners
hammers

HANDLING

bulldozer blades
tractor rollers, idlers
sprockets, grouser bars
truck beds
grizzle parts
ore car wheels and liners
sheaves, gears, pinions

Amsco also produces other alloy steels with maximum wear resistance under particular conditions of service.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Ill.

Turn your earthmoving PROBLEMS into PROFITS!

Here's how M-R-S can help you solve three pressing problems...

High Machinery Prices . . . Rising Operating Costs . . . and Increasing Competition are three of the most pressing problems confronting the grading contractor today. M-R-S Tractors, equipped with exclusive M-R-S Weight Transfer, help you solve these problems by producing more dirt per dollar of machinery investment . . . more dirt per dollar of payroll . . . and more dirt per dollar of fuel, maintenance and overhead.

WEIGHT TRANSFER MAKES THE DIFFERENCE!

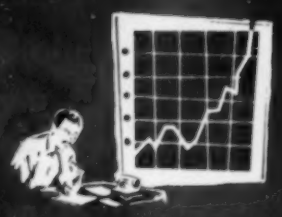
M-R-S Weight Transfer, coupled with the special M-R-S Four-Wheel Tractor design, means greater scraper capacity per horsepower . . . more dirt hauled per cycle . . . more yardage in place on the fill at the end of each shift.

Equip your spread with M-R-S Tractors now before the '55 work season gets too far under way! With M-R-S Tractors and your competent management, you can get the award and make a good profit as well!

THE EMBLEM OF DEPENDABILITY

M-R-S MANUFACTURING COMPANY

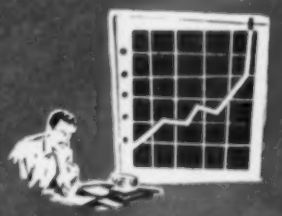
FLORA, MISSISSIPPI



MACHINERY COST

● With machinery prices higher than ever before, it's the price per yard of struck scraper capacity that counts. The **EXTRA HIGH** hauling capacity of M-R-S Tractors makes possible the **LOWEST PRICE PER YARD** of hauling capacity on the equipment market. Also, the cost of M-R-S Tractors to you can be even **LOWER** since you can use big, 4-wheel scrapers you already own. M-R-S Tractors provide the right capacity for **EVERY JOB** . . . even to those requiring the world's largest grading team, the M-R-S 200 and the Wooldridge—M-R-S 30 c.y. struck capacity scraper. Another big profit factor in M-R-S Tractors is their unmatched versatility. Your investment is not idle when, in addition to moving dirt, you can put your M-R-S Tractors to work powering heavy sheepsfoot rollers; heavy rubber-tired rollers; machinery trailers and other useful construction tools.

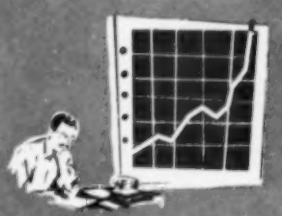
See Your Nearest Dealer For The Complete M-R-S Story!



OPERATING COST

● The special M-R-S principle of operation cuts operating costs in two ways. **FIRST** . . . Because of extra hauling capacity, M-R-S Tractors give more production for the fuel, lubricants and other supplies you buy. **SECOND** . . . M-R-S Tractors are spared the heavy pounding and surging of heavy scrapers and payloads at high speeds. You'll get higher production because of less downtime for expensive repairs and therefore greater availability to perform profitable work.

See Your Nearest Dealer For The Complete M-R-S Story!



COMPETITION

● Even with more work available now than ever before, the contractor is confronted with more and more competition on every job he bids. **YOU OWE IT TO YOURSELF** to investigate how the superior production capabilities of M-R-S Tractors enable you to bid successfully and **STILL MAKE A FAIR PROFIT ON EACH JOB!** The contractor who is aware of the most modern, profit-making developments gets the best jobs and is able to retain a good profit margin.

See Your Nearest Dealer For The Complete M-R-S Story!

THE PROFITABLE ANSWER

M-R-S

● **THE NEW LINE OF M-R-S TRACTORS INCLUDES FOUR HIGH-PRODUCTION MODELS: M-R-S 200 — 352 H.P. . . . M-R-S 190 — 288 H.P. . . . M-R-S 150 — 262 H.P. . . . M-R-S 125 — 210 H.P.**

Investigate M-R-S Before You Invest . . . . . Get the complete M-R-S story from your nearest dealer or write today for full information about the most modern hauling equipment on the market.

FOREIGN DEALERSHIPS AVAILABLE!

CHARLES R. COX

Portrait by Fabian Bachrach

"I urge every executive..."

"I know of no better method for each citizen to protect the American way of life than by building his own economic security and by helping his Government to keep financially sound. Both these results can be accomplished through the Payroll Savings Plan. I urge every executive in the nation to give this Plan his active and vigorous support."

CHARLES R. COX, *President, Kennecott Copper Corporation*

With the active cooperation of Mr. Cox, Kennecott conducted a person-to-person canvass which put a Payroll Savings Application in the hands of *every* one of Kennecott's 20,000 employees. The men and women of Kennecott did the rest. Country-wide participation in Kennecott's Payroll Plan rose from 24% to 52%.

Your State Director, **U. S. Treasury Department**, is ready to help you **install a Payroll Savings Plan**, or show you how to build **participation in an existing Plan** through a simple person-to-person canvass. Write today to Savings Bonds Division, **U. S. Treasury Department**, Washington, D. C.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

EXCAVATING ENGINEER

Versatile "D" heaps load with help of small 66 dhp tractor. Rig can also self-load effectively in most materials. Two machines, using own dozer blades or push-plates, can quickly load each other.

Work in close quarters
Make sharp turns
Climb steep banks

After spreading on levee, units travel down bank to canal. Sharp turns are easily negotiated with "D's" ability to turn around non-stop in space only 26' wide.

2 Tournapulls, owned by Jordan, Ruff & Spurlock of Hayward, California, relocate Livermore Canal in Alameda County. "Can't beat these machines on this type of work," say the owners.

Owner records, covering the first 20 working days, or ⅔ of the 60,000 yard, 1½ mile state-sponsored excavation project, show excellent production for their two side-boarded 7-yard D Tournapulls.

Average 150 yds. hourly on 1000′ hauls

On average 2000′ cycles — hauling along the canal bottom, up a steep bank, and spreading on top of a levee — each Tournapull delivered a load every 4½ to 5½ minutes. Owners estimate loads in the dry clay material ran around 6½ to 7 pay yards each. Production per machine on the 1000′ hauls averaged 10 to 12 loads per 55-minute hour...combined hourly output for the 2 machines varied from 130 to 168 pay yards. Most of the time during the 200 working hours studied, when hauls were somewhat shorter than 1000′, owners figure combined hourly output was almost exactly 200 pay yards.

"You just can't beat Tournapulls for this type of work," is the conclusion of Jordan, Ruff and Spurlock. "The 'D's' work fast in close quarters, make sharp turns, produce well, and at low cost."

Drive job-to-job at speeds to 28 mph

Another advantage of these 140 hp machines is their job-to-job mobility. A typical 50-mile trip through city and country traffic takes about 2 hours. Top speed is 28 mph. No trailers are needed, no loading, no blocking . . . "D's" go everywhere under their own power.

You, too, can save time and make more money with D Tournapull's high-speed, rubber-tired mobility and production ability. For proof, see your LeTourneau-Westinghouse Distributor. Ask for a demonstration . . . find out first-hand how the versatile "D" can make money on one-man, one-machine dirtmoving, or as a production tool in pusher fleets.

Tournapull—Trademark Reg. U.S. Pat. Off. DP-721-D-b

A Subsidiary of Westinghouse Air Brake Company

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

Contract work on the Niagara River Remedial Project was directed by the district engineer of the Buffalo District, Corps of Engineers, U. S. Army.

Wire Rope at Work—Recently Norman H. McLain, Buffalo contractor, undertook the formidable task of diverting a portion of the swift Niagara River, just above the Falls. His was the job of exposing—temporarily—many acres of riverbed so that thousands of cubic yards of rock could be removed. Purpose: to create a more uniform distribution of water over Horseshoe Falls and thereby check the severe erosion at the center of the crest.

In constructing his diversion dam, McLain first erected a shield that was held in place by Bethlehem wire ropes, anchored upstream. In addition, to prevent lateral drift, a separate cable was run from the shield to a nearby point of land. This device, secured by the strong steel ropes, made it possible to construct the temporary dam, section by section, and thus assure successful completion of the project.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:
CONSTRUCTION • MINING • PETROLEUM • EXCAVATING • QUARRYING • LOGGING • MANUFACTURING

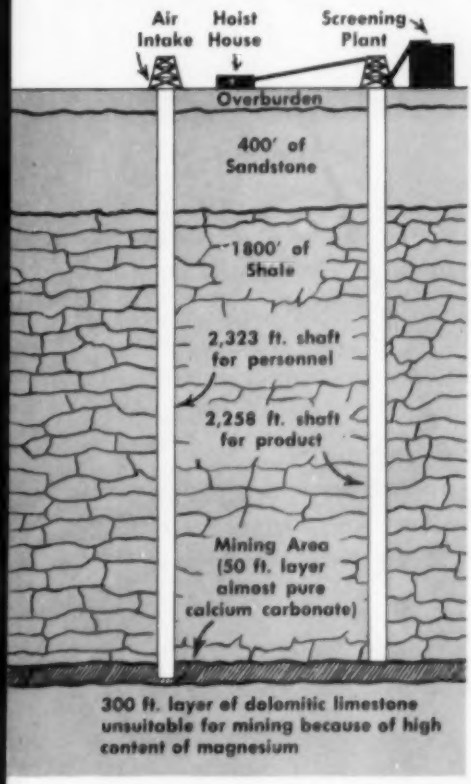
2300 ft. underground

7 Rear-Dumps haul million tons of limestone yearly

Imagine yourself with the problem that faced a large Eastern chemical company a few years ago.

Your plant needs thousands of tons of limestone daily for manufacture into agricultural lime and cement, and for chemical processing into chlorine, soda ash, and other products. Much of your stone has to be shipped in. Transportation prices are boosting your costs.

With these difficulties, you'd undoubtedly do what this company did — look for a nearby source. You'd probably never guess what would turn up. Some 2,300′ below your own backyard, under clay, shale, and sandstone, your drills would run into a 50′ layer of almost pure limestone. Satisfactory material, tests showed, for all your needs. But how could you get to it?



300 ft. layer of dolomitic limestone unsuitable for mining because of high content of magnesium

Diagram shows the two 8′ x 17′ shafts. One carries men and equipment, the other brings crushed limestone to the surface. Shafts also carry in 100,000 cubic feet of fresh pumped air every minute. They also take out blasting and diesel fumes. The natural mine air is dry . . . no water drips from ceilings or seeps through walls. Temperature stays 80° year-round. Cave-in dangers are absent . . . strength of the limestone sidewalls, plus arching effect of 2,000 ft. of rock above, eliminates need for shoring or other artificial bracing.

Sink two 2300′ shafts

This company answered that question by borrowing some ideas from underground ore and coal miners. First, they drove two 8′ x 17′ steel-and-concrete-lined shafts vertically to the limestone bed. Then, they developed a network of underground roads (now totaling 19.9 miles) to a centrally-located crusher. Next they equipped the mine with 4 electric shovels, 9 drilling rigs, a tractor, 4 loaders, 4 trucks, and a bus to move 80 workers to their assignments.

For hauling, they chose 7 LeTourneau-Westinghouse Rear-Dumps, 16-ton models with bodies built up to hold 20 tons. These units, company officials figured, would be ideal for underground use, because they could turn non-stop anywhere on the narrow 32′ roadways — and their simple rugged construction would reduce repair work.

Assemble machines on mine floor

Then came another problem: how to get these big Rear-Dumps into the mine, nearly ½ mile below? LeTourneau-Westinghouse engineers helped out here. The rigs were shipped to the plant tack-welded. Wheels and prime-movers were separated and lowered down the shaft. Truck bodies, too, were cut apart and lowered. Re-welds and re-assembly were made on the mine floor, and work was started.

With the 1½-yd. shovels loading well-blasted limestone, each Rear-Dump gets 20-ton heaped load in about 2 minutes. Haul of 3,000′ one way over the level underground roads is made in 2nd and 3rd gear (7 and 13 mph); return in 3rd. The 7 Rear-Dumps average 3,600 tons of limestone per 16-hour day . . . over a million tons per year. Short turns with power steer have proved a major advantage in speeding spots at shovel, for backing to dump into hopper, and for maneuvering in all tight spots.

Another advantage these Rear-Dumps have given is safety. *Each* of the 4 wheels has more braking surface than *all 4* wheels on most haulers. Operators travel confidently at high speeds.

A third advantage . . . there has been practically no downtime for tire troubles on the Rear-Dumps' big single pneumatics. In 4 years of single and double-shifting the 7 units, only one blowout has occurred. Sets of tires have lasted as long as 7,000 hours without recapping, despite the rough pit floor and heavy 20-ton loads. Plant records show over-all mechanical efficiency for all the Rear-Dumps of 96%.

You, too, can lick your hauling problems with LeTourneau-Westinghouse Rear-Dumps. Ask for a demonstration on your job. There's a size to fit your needs . . . 9, 18, 35, and 50 tons.

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

R-664-Q

DIESEL AND GASOLINE ENGINE OPERATORS

A NEW PM TOOL

ADC* Oilprint Analysis

CHECKS CRANKCASE OIL IN MINUTES

Shell Research gives you new oil-change yardstick—

Now—operators can test crankcase oil in the short time allotted for refueling and crankcase oil checks. The Shell ADC Oilprint Analysis gives a practical and accurate oil evaluation in minutes.

ADC Oilprint Analysis means big savings when used in your preventive maintenance program . . . gives valuable information on engine and oil conditions. It answers the question "When do I change my oil?" thus eliminating the draining of usable oil and the risk of using oils loaded with contaminants.

See for yourself how the new Shell ADC Oilprint Analysis can save you money in preventive maintenance. Let us show how you can use this new service for your equipment.

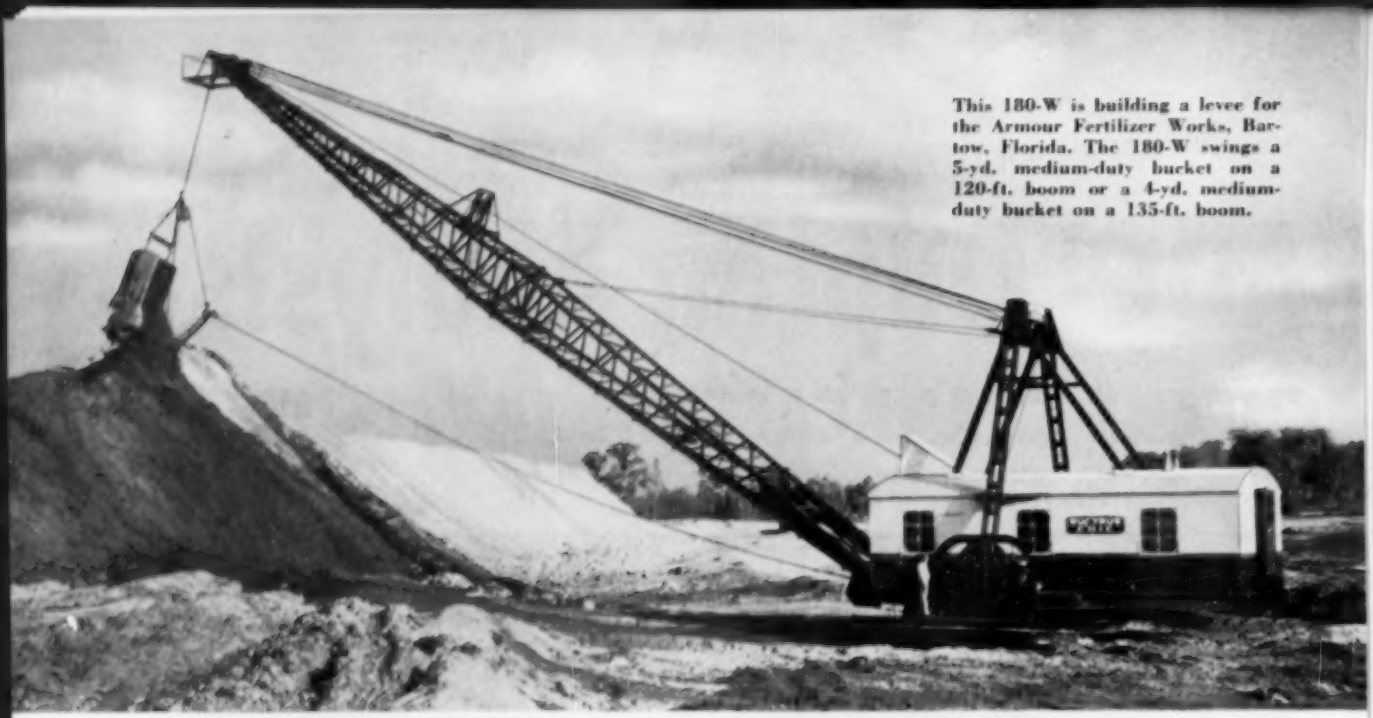
SAVES... Time, Money, Engines, Oil

*Trademark

SHELL OIL COMPANY,

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL



This 180-W is building a levee for the Armour Fertilizer Works, Bartow, Florida. The 180-W swings a 5-yd. medium-duty bucket on a 120-ft. boom or a 4-yd. medium-duty bucket on a 135-ft. boom.

BIG CAPACITY Digging Ability... Readily Moved From Job to Job

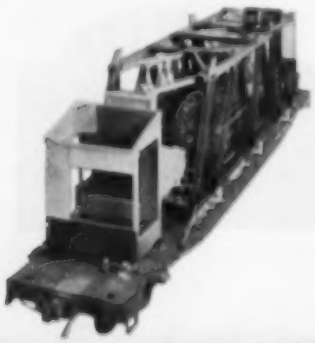
BUCYRUS-ERIE 180-W WALKING DRAGLINE

Mining and quarrying jobs need the economical, high-capacity dirt moving offered by Bucyrus-Erie walking draglines. The new 180-W has it plus unmatched ease in moving from job to job.

The 180-W is readily dismantled — only partial disassembly is necessary for moves. No main machinery components are disturbed; misalignment problems are eliminated. Ease of moving saves time and expense and greatly increases the 180-W's value throughout its life.

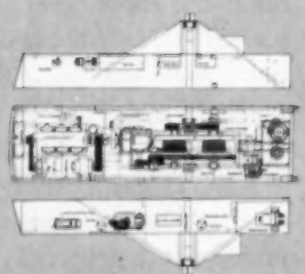
Along with its unusual portability, the 180-W brings to more jobs the dependable, big-output performance; quick maneuverability; long working range; and low maintenance costs that are traditional in every Bucyrus-Erie walking dragline. Send for complete information.

38L55C

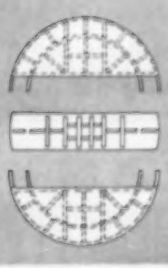


The operator's cab and center section of the revolving frame, loaded on a flat car for shipment, are shown here.

FIVE U.S. RAILROAD CARS CARRY ENTIRE MACHINE



Side wings unbolt from center section of revolving frame. Main machinery remains fully assembled, stays in proper alignment.



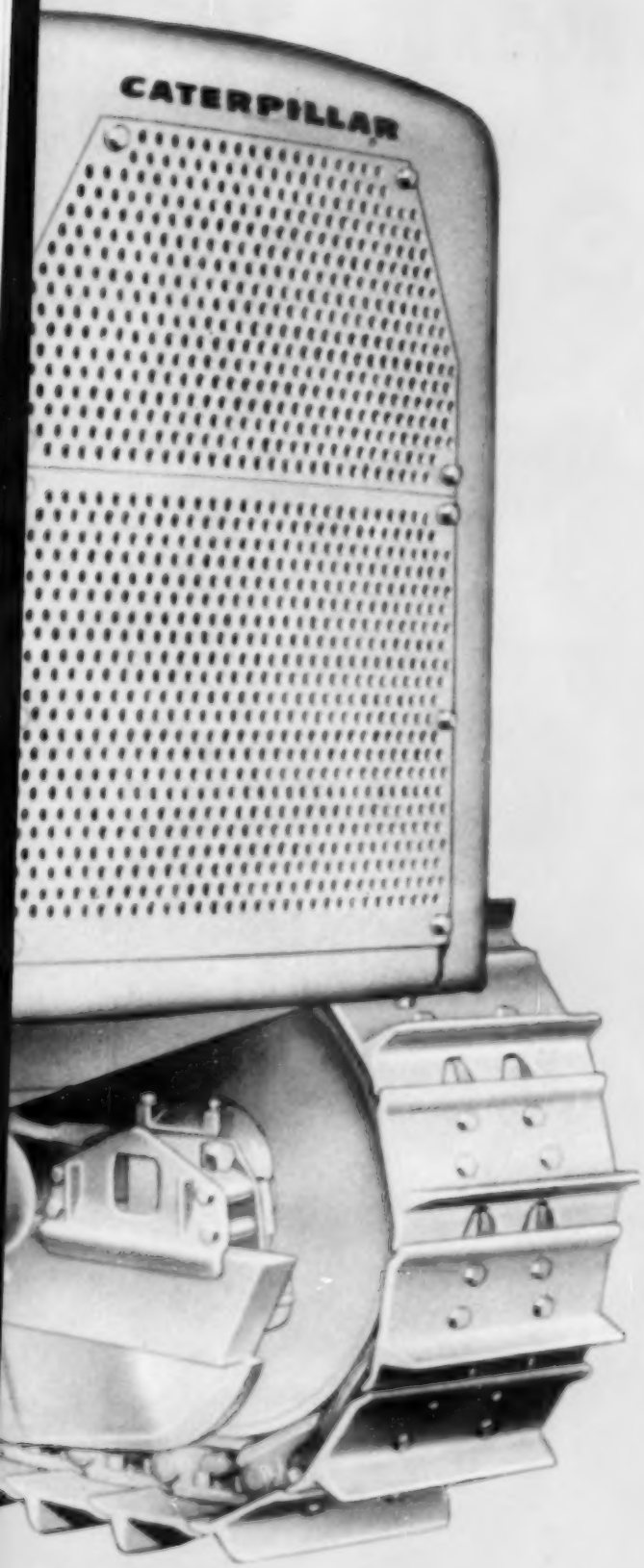
Base is in three separate welded steel sections, joined by bolting flanges—easily disassembled and shipped.

BUCYRUS ERIE

South Milwaukee Wisconsin

1880 75 1955

YEARS OF SERVICE to Men Who Shape the Earth



IT'S HERE ➧

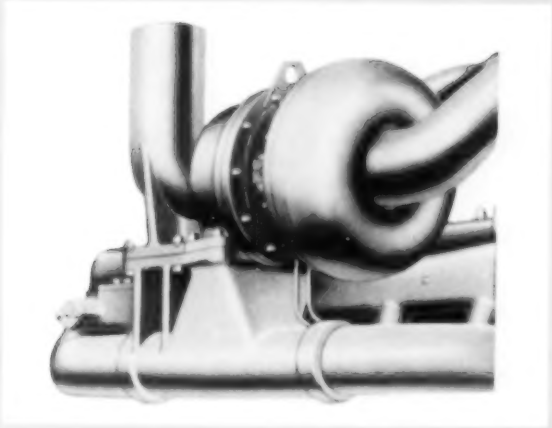
CATERPILLAR ANNOUNCES THE

D9

230 HP
(DRAWBAR)

56,200 LB.

. . . Caterpillar Leadership in Action!

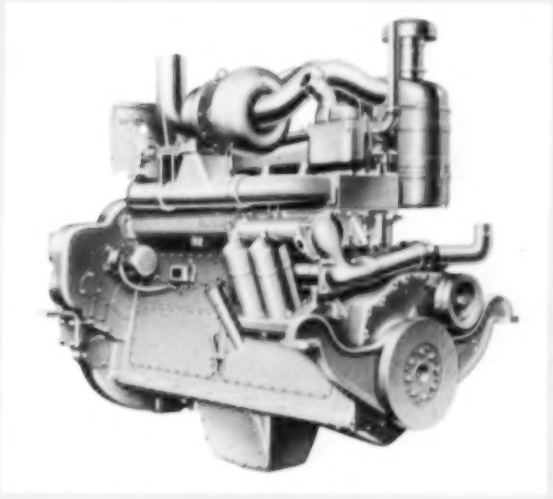


FIRST TRACK-TYPE TRACTOR WITH TURBOCHARGER!

The D9's new Turbocharger is driven by the engine exhaust, utilizing energy which would otherwise be lost. In addition, it packs air into the engine according to engine *load*, not speed. This means more working horsepower—greater performance.

CHOICE OF TORQUE CONVERTER OR DIRECT DRIVE!

Two types of drives are available, the exclusive Caterpillar oil clutch with six-speed (forward and reverse) transmission or a three-stage torque converter with 5:1 torque ratio. The transmission used with the torque converter has three speeds forward; two reverse. This option enables you to match the drive you want to your job requirements.



COMPLETELY NEW 286-HP ENGINE!

In addition to the Turbocharger, the powerful new D9 Engine features a 6¼" bore and 8" stroke and runs at 1200 r.p.m. Long life and dependability are promoted by stationary oil jet piston cooling; short, rigid valve push rods give smooth, accurate valve action; "Hi-Electro" hardened gear at the rear of the crankshaft drives timing gears and accessories; and many other advanced features.

WIDE RANGE OF OPERATING SPEEDS!

TORQUE CONVERTER:

3 speeds forward, 0 to 4.1 m.p.h., 0 to 5.7 m.p.h., 0 to 7.8 m.p.h.
2 speeds reverse, 0 to 4.1 m.p.h., 0 to 7.8 m.p.h.

DIRECT DRIVE:

6 speeds forward, 1.6, 2.1, 2.9, 3.9, 5.0, 6.8 m.p.h.
6 speeds reverse, same.

CONSTANT-POWER DRIVE FOR REAR-MOUNTED EQUIPMENT!

You always have power for cable controls, direct from the engine's rear power take-off. This makes cable control operation completely independent of flywheel clutch or torque converter and gives you a big boost in operating efficiency.

The D9...
proven in the field for a year!

Though new, the D9 is already a veteran. After exhaustive proving-ground tests, several D9s have been tested for over 19,128 hours on the toughest jobs in logging, construction, mining and quarry work. These jobs tested every square inch of this mighty new machine. The word from the field: "By far the best big tractor ever made."

Rugged—
and easy to service!

From its one-piece welded steering clutch case-frame assembly, to its track shoes hardened by the "Water Quench" process, the D9 is the toughest crawler built. And it's designed for easy servicing. Oil clutch, torque converter, transmission case and steering clutches can each be removed individually without disturbing other components. Hydraulic track adjusters are among the many other features for fast, easy adjustment and service work.

Brief specifications

Length: 17' 10¼"
Width: 9' 11¼"
Height: 8' 9"
Gauge: 90"
Weight: 54,000 lb. approx., dry
56,200 lb. approx., operating

Easy to operate!

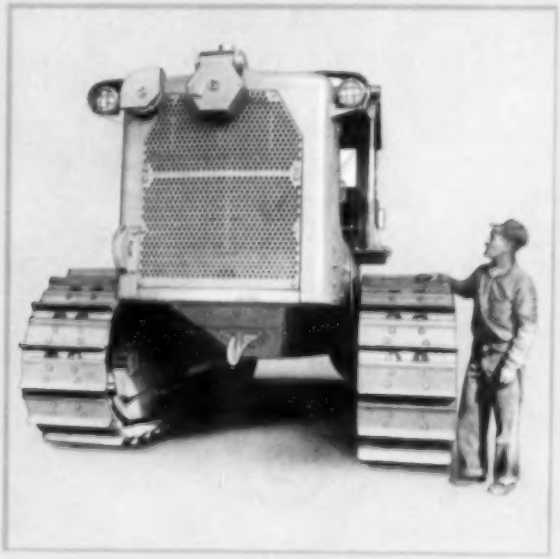
- The independent "live-shaft" drive for cable controls makes operation smoother, easier.
- Hydraulic boosters provide both power steering and power braking.
- Adjustable seat, all-around visibility, easy access to all controls make operator's job simpler.
- Important new 7-roller track frame improves stability, flotation and ride.
- New starting engine has electric starting system and simple single-lever control for easy operation from the seat and insures fast starts in all weather.

Equipment

New CAT®-built 'Dozers for the D9: the No. 9S Bulldozer, modified straight blade; the No. 9A Bulldozer, angling blade.

New Cat-built Cable Controls: the No. 29 rear-mounted, double drum; the No. 30 front-mounted, single drum.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.



MAIL TODAY!
CATERPILLAR TRACTOR CO., Peoria, Illinois, U. S. A.
I'd like more information on the D9.
Name _____
Company _____
Address _____
City _____ Zone _____ State _____

CATERPILLAR*

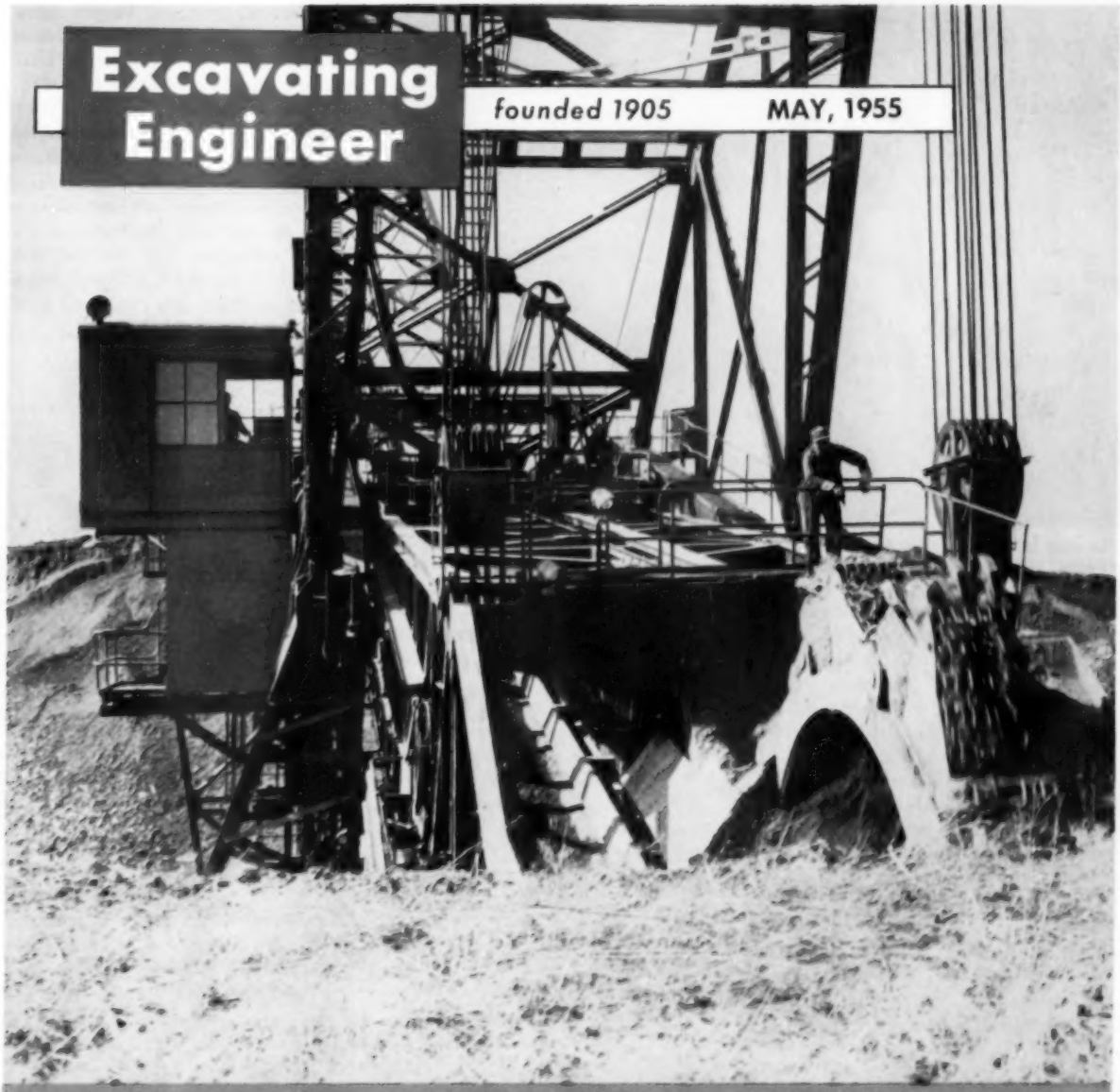
*Both Cat and Caterpillar are registered trademarks — ©

**THE D9...
NEW KING OF THE
CRAWLERS**

PRINTED IN U. S. A.

Excavating Engineer

founded 1905 MAY, 1955



Wheel Excavator:

Coal Stripping Tool with a Future

The wheel excavator comes of age with Bucyrus-Erie's new machine. It is the first unit built from the ground up for wheel excavator service. Truax-Traer Coal Co. puts wheel to work.

(Please turn page)

The man in charge of these simple lever controls has in his power the king-size excavator shown at right. His machine is the Bucyrus-Erie 954-WX wheel excavator.

TWENTY years ago, they used to say around the open-pit coal mines, "The overburden isn't getting any shallower." The open pitters said it then and they say it now; and, of course, it's just as true in 1955 as it was in 1935.

What these men mean is that the average overburden depth keeps rising. Inflexible rule: you have to pull off more yards of overburden this year to load out a ton of coal than you did last.

Once you could buy a bulldozer and strip plenty of coal which went from outcrop to 10 or 15 feet of cover. That opportunity is not very commonplace anymore. Before the war and up to a few years ago, the coal which lay under 40 foot and less burden was in ample supply. It, too, is becoming rare.

Easy Coal Vanishes

Mine superintendents use a term which describes a desirable coal-overburden ratio. They speak of "easy" coal. Easy coal is shallow—that which they can mine at low cost. Most coal is deep and hard to mine. Here's how it seems to the mine operators: the easy coal is always disappearing and the mine is perpetually confronted with the problem of mining the hard-to-reach coal.

The Truax-Traer Coal Co., one of the country's leaders, is familiar with these problems. The company presently operates 16 mines in three states: West Virginia, Illinois and North Dakota. Several Truax-Traer mines would rate a listing among the 50 largest of this country. Their No. 1 customer is the steam-power market. Their output ranges all the way from lignite to very high grade bituminous.

The increasing overburden depth problem is common to most Truax-Traer properties. Boiled down to the way the mine owner must face the problem, it is this: How to mine more coal at less cost in spite of more overburden. The fact that companies like Truax-Traer stay in business year after year and make a profit is proof that they are in the habit of solving this problem on a continuing basis.

One of Truax-Traer's most important properties—though not its biggest producer—is the mine at Fiatt, Ill. It is located in Fulton County approximately 35 miles west of Peoria. Take Highway 9 out of Canton. You will see the tipple on the left hand side of the road as you pass through Fiatt.

The big problem at the Fiatt mine is the same we have been talking about: overburden getting deeper. The new solution which the owners recently put into effect is dramatic, and, at the same time, typical of the way this company and others must meet production problems to stay in business.

Let's let Mine Superintendent Byron Somers sketch the picture for us. Somers knows lots of the problems of mining in Illinois as his entire 39 years of mining experience has been spent in Illinois. Sixteen years were spent in a deep mine in southern Illinois and 23 years in strip mining as superintendent with Truax-Traer Coal Co.

Byron Somers headquarters in a tidy little office within a coal lump's throw of the mine tipple. He folds his arms now and settles back in his chair to brief us on the Canton mine.

"We've just about run out of easy coal in this mine. At the present time, we're mining in three pits and only one of them is what you might call easy coal. That's the one which you probably noticed on the right hand side of the highway when you came in. We have an old Bucyrus-Erie 17-yard shovel stripping in there. He's in some stuff

which is in the neighborhood of 40 feet, but that's about the end.

"Our problem here was the same as in a hundred other mines. We had to learn to remove the deeper overburden at less cost in the face of a slightly declining market.

"When we got into the 50 to 75 foot overburden, we put two machines in the pit. A dragline was sent in to help a large stripping shovel like the Bucyrus-Erie 950-B. The second rig had to have enough capacity to bring the load on the shovel back to normal and enough reach and height to cast the material above and behind the shovel spoil.

"When the overburden became more than these two could handle efficiently, a third excavator was bought for the pit. This machine was a dragline, too. It sat on top of the spoil and pulled back part of the spoil to make more room.

"When you get three big machines working close together in a pit, you're giving away some of your efficiency. Then, too, you've installed a third machine which does nothing to add to the amount of coal being recovered. It merely rehandles material dug by the other two excavators. You have three machines to operate and maintain, three sets of operating crews, but only two machines are actively engaged in uncovering coal.

"Such operations proved costly. It was time to find methods to do the job better

Note wide coal seam easily attained with wheel excavator's reach. It's 350 feet from wheel front to stacker terminal pulley.

and cheaper.

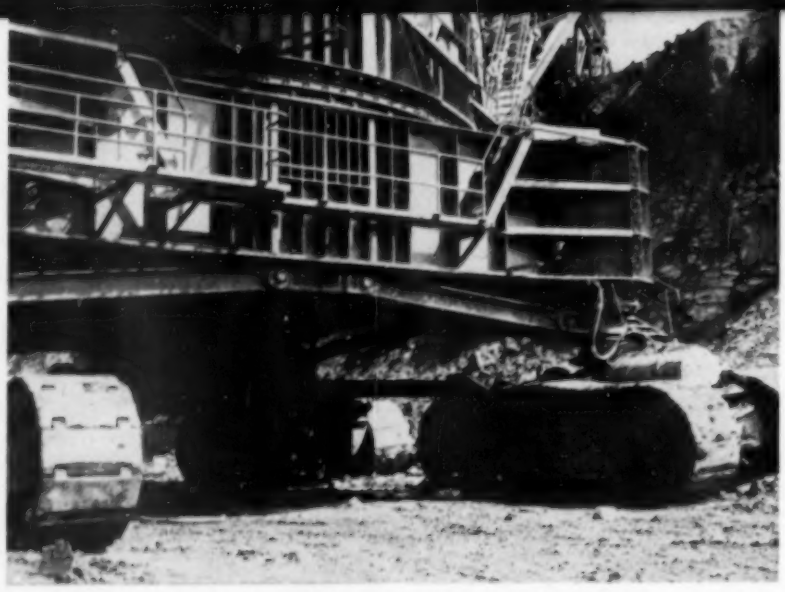
"We think we have the answer in the wheel excavator. It was approximately two years ago that we commissioned Bucyrus-Erie Company to build a wheel excavator for us.

"The wheel worked for us for the first time late in the day on November 15th of last year. Under the very capable direction of Bucyrus-Erie Company personnel including Mr. Dave Bain, field erector, Mr. G. F. 'Cottie' Holderman, field electrician, and Mr. Mort Sundnes, design engineer, our crew got the machine put together on that day after some months of effort and we just couldn't resist seeing how she'd work. So we stuck her nose into the overburden for a while before we went home.

"She's been working steadily most of the time since then. We think the wheel excavator is the present solution to our deep overburden problems."

The Bucyrus-Erie 954WX wheel excavator—as it is designated—now stripping coal at Fiatt, Ill., is an impressive machine to see. It is the first such machine built exclusively for wheel excavator service from the ground up, or more correctly, from the coal up.

The mechanical principles of its operation are simple. A bucket-studded wheel revolves into the overburden face. When the buckets reach the top segment of the wheel circle, their dirt load falls onto the first of two conveyor belts.



Quick-acting hydraulic jacks at each corner of base keep 2½-million pound machine level. Each crawler unit has own motor. Ground man controls hydraulic steering.

This belt moves the dirt to a point above the house which is near the machine's center. Here the dirt drops from the first belt to another, longer belt which is supended behind the machine. The second belt carries the dirt way out behind the machine and stakes it on the spoil banks.

The wheel excavator weighs in for work at 2½ million pounds. It stands on the coal seam which serves as a road for travel. It moves on four sets of crawlers like those of a large stripping shovel. A specially insulated, fully enclosed AC motor drives each of the four caterpillar units.

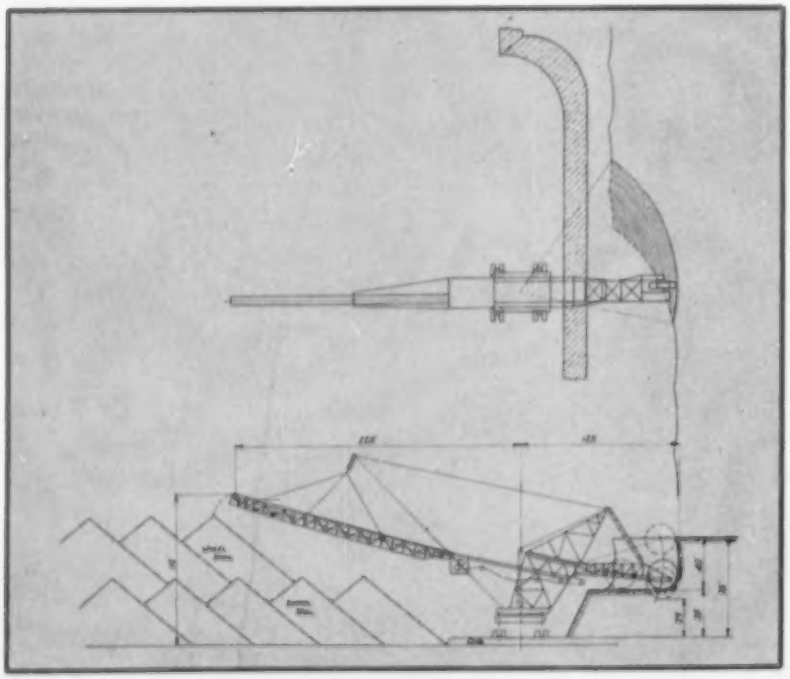
The ground man steers the excavator by hydraulically slewing the crawlers to right or left. The crawler steering units are connected so that the forward and rear sets may be slewed in the same or opposite directions. This action gives the same effect as four-wheel steering in a wagon.

Hydraulic jacks at the base's four corners keep the machine level. A mercury switch and piping design equalizes pressures in the jacks and makes the leveling process automatic and almost instantaneous. The design gives the machine great stability and reduces uneven wear on many parts. Ball and socket joints at top and bottom give the jacks extra flexibility.

The machine may be propelled in only two positions. When the conveyors are parallel with caterpillar travel direction or when they are at right angles to it, the wheel excavator may be put into propel. In any other position, limit switches will prevent propelling. The design minimizes loads on the lower works.

Propel speed is 17.24 fpm or .19 miles per hour. Move-ups usually take only a few minutes. Horns serve as "keep clear" signals during propel.

The revolving frame is entirely a wheel excavator unit. It is designed to support all the swinging parts and to withstand the loads from them. The way these loads act on the frame is peculiar to the wheel excavator and special design in the revolving frame is necessary. The frame unit is approxi-



Drawing shows machine's position in pit. Reach and height give rig many advantages.

mately 48 feet long, 30 feet wide and 50 inches deep.

The entire machine above the base can be swung through a complete circle. Swing circle diameter is 34 feet. Two swing units give the machine correct speed for digging. The swing mechanism produces a maximum 30,000 pound side digging force on the buckets. Normal swing speed is $\frac{1}{6}$ to $\frac{1}{10}$ rpm.

While it's digging, the business end of the machine fans back and forth across the face of the cut. The motion is similar to the way you would mow a lawn if you used an arc path and moved out a foot or two on each pass.

The business end of the wheel excavator noses into the dirt overburden. The digging wheel and machinery are mounted on an all-welded structural steel digging ladder. At its inner end, the ladder is equipped with trunnions on which a saddle block and rack pinion are mounted. The saddle blocks are supported on the lower beams of a crowd machinery frame. On the upper beams of the crowd frame 35 feet of gear tracks are mounted. Thus the digging ladder may be extended or retracted. It may be crowded out to keep the buckets in dirt. It may be moved a total length of 35 feet along the crowd frame which is inclined at a 12° slope. The crowd machinery frame forms part of the machine's superstructure. With a high wall slope of 2 feet vertical to 1 foot horizontal, the wheel excavator will dig a shelf in excess of 50 feet wide.

Digging Ladder

The digging ladder is 70 feet long, measured from centerline of trunnions to centerline of digging wheel. The spread from centerline to centerline of saddle blocks is 19 feet 10 inches. The ladder structure is 15 feet 3 inches wide and 12 feet high at the highest point.

Sixteen feet aft of the digging wheel the digging ladder is supported by two 10-part tackle blocks. The suspension points were selected with two thoughts in mind. First, the locations are designed to relieve the rack gearing and the saddle blocks of as much load as possible. Second, the wide-spread twin suspension is calculated to resist the rolling or twisting forces imposed on the ladder by eccentric loads from the swinging forces acting on the wheel during digging.

The upper blocks of the digging ladder suspension tackle are mounted on an all-welded digging ladder gantry.

The live ends of the suspension tackles lead over sheaves in the superstructure to twin drums. These drums are part of the digging ladder hoist machinery unit which is mounted on the revolving frame. One motor is geared to drive the twin drums. In order to adjust the two suspension tackles to equal length, and thus keep the digging ladder in correct plane, a disengaging coupling is provided. It allows each drum to be rotated independently of the other. The chance of getting the digging ladder out of level laterally is remote but the slip clutch allows for re-setting.

The hoist machinery raises or lowers the wheel within limits specified for the machine. The effective digging range is from 29 feet above the coal bed to 75 feet above the coal bed. In extreme low position, the digging ladder conveyor will follow a 12° incline. In the extreme high position, the downward decline of the conveyor is 15°. The crowd machinery unit, providing the crowding action

High belt speeds keep the dirt moving. Normal stacker belt speed is 1,000 fpm while the digging ladder belt travels 850 fpm.

Erecting Engineer Dave Bain watches as stacker belt speeds dirt to the spoil pile.

to the ladder, is located at the top of the ladder at its inner end.

The digging wheel is equipped with 9 chain-backed buckets and it measures 22½ feet in diameter over the bucket lips. Heavy backing chains assure rapid dirt fall-out when the buckets reach discharge position. Just how much dirt these buckets can dig is only expressed by bringing in the element of time. We say that a shovel is a 10-yard shovel or a dragline is a 20-yard dragline but these designations have only limited meaning when speaking of the wheel excavator.

Actually, the Bucyrus-Erie wheel excavator has a wheel capacity of 7.875 cubic yards of dirt. The figure is obtained by multiplying the 9 buckets by the individual capacity, ⅞ cubic yard. This is the static dirt holding capacity with all buckets filled, or the theoretical amount of dirt the machine would excavate in a single revolution if each bucket obtained a full load. The "cruising" speed of the wheel is 5¼ revolutions per minute which breaks down to a rate of 52 buckets past the digging point in a minute.

Probably the most important statistics in considering the capacity of the wheel excavator, however, do not concern the wheel itself. They are concerned with the conveyor system. It is the speed of the conveyors times their capacity which determines the maximum performance possible with a wheel excavator. The dirt conveying system literally determines how much dirt the machine can move.

Two conveyors are incorporated in the Truax-Traer wheel excavator, as previously explained. Both belts are 54 inches wide and one inch thick. Both are products of the United States Rubber Co.

Belt speeds are high—so high they were believed impossible for this type of service a few years ago. Normal running speed for the digging ladder belt is 850 fpm and the normal speed for the stacker conveyor belt is 1,000 fpm. These are the standard operating speeds but they may be varied. Both belts are driven by General Electric DC motors under Ward Leonard control which allows the speed to be adjusted to suit digging conditions.

The speed and capacity of these belts determine what "size" wheel excavator you have. Maximum capacity, at 100% efficiency, would be maximum speed under a fully loaded belt. Although the Bucyrus-Erie wheel excavator has reached an operating rate of 79% of the available time (during a period of adjustment and experimentation), complete performance specifications are not yet ready for release.

Getting back to the wheel itself, each bucket has four teeth spaced on the lip to produce proper slicing of the material being dug. Two pins and four bolts hold each bucket to the wheel. When these are tightened, they firmly wedge the bucket to the wheel.

Buckets may be easily and quickly removed and replaced with spares when repairs are called for. This feature keeps bucket maintenance shutdown time to a minimum. It also makes bucket repairs an item which may be handled in the shop where better quality work is usually the rule.

Another interesting feature of the wheel is the application of heat to the buckets during exceptionally wet or cold

Here is transfer point where dirt tumbles from digging ladder belt to stacker belt.

Superintendent Byron Somers calls the Bucyrus-Erie wheel excavator "the answer" to Fiatt Mine's deep overburden problems.

weather. The heat makes use of the principle that dirt will not readily stick to a hot metal surface. An Aeroil kerosene-burning torch, fed compressed air to atomize the oil, is mounted on the digging ladder behind the wheel. The flame is directed toward the buckets from a 10-ft. distance. Also mounted on the ladder is a 591-gallon kerosene tank and a compressed air supply. The torch burns constantly during wet and freezing weather.

A pioneer in the use of heated digging buckets is the Truax-Traer organization. General Electric Calrod units are affixed to stripping shovel dippers throughout the mine. The 30-yard Bucyrus-Erie 950-B shovel which works with the wheel has heat on the dipper.

Calrod units are also part of the wheel excavator buckets. Units are installed in the heels of the buckets. A new set of buckets being designed by Bucyrus-Erie for the wheel will have Calrod units in their sides as well as heels.

The wheel drive unit is mounted on deep, heavy girders properly designed to prevent excessive and damaging deflections to shafts, gears, and bearings. Anti-friction roller bearings are used throughout this unit. The wheel itself is mounted on a non-rotating shaft whose diameter is 16 inches under the bearings.

Wheel Protection

To absorb shock digging loads, a rubber cushioned clutch is installed on the wheel. To prevent damage from severe overloads, a "Fawick" type air cushioned coupling is part of the drive machinery. If the wheel stops dead, as it might upon striking a large boulder, no damage will result to the machinery.

The machinery is powered to deliver a maximum digging force at the bucket lip of 47,000 pounds (compared with a digging force on the 950-B of 200,000 pounds).

If the wheel discharged dirt from the buckets at an approximate 10-ft. height above the digging ladder belt in an unbroken fall, the continuous impact would soon wear out the belt. To ease the fall, a slope sheet is installed under the buckets. This inclined plate delivers the dirt to the belt with less force. A motor-powered scraper revolves across the slope sheet surface. Its purpose is to discourage dirt build-up.

Even with the slope sheet, the discharge to conveyor is pretty forceful and requires a specially designed conveyor for this severe service. Conveyor idlers, for example, in the loading zone are 12 in. rubber diameter discs mounted on 4 in. diameter steel tubing. Bearings are of the anti-friction, self-aligning roller type. They are mounted on $1^{15}/_{16}$ inch diameter shafts.

Another unique feature of the conveyor design is the positioning of the rollers. Only the inclined concentrating side rollers are in line. Center rollers are spaced staggered between the side rollers. This design was adopted to distribute the load more evenly and also to afford more uniform support for the conveyor belt. Spacing of impact idlers is 14 inch-

Stacker lets dirt down gently, spreads it over three spoil piles. Discharge method minimizes chances of dirt slides.

es, leaving only a one inch space between center and side idlers where they lap over each other.

Outside the loading zone the idlers are of steel. Diameter is 7 inches and the anti-friction bearings are mounted on $1\frac{7}{16}$ inch diameter shafts.

The conveyor is so designed that multiple sections could be assembled and adjusted for proper levels and lead of the concentrating idlers in the manufacturer's shops. The field erection and training of the belt then became a simple matter. So successful was this procedure that the stacker conveyor which is 285 feet between terminal pulleys required no belt training at all.

A high pressure hydraulic pump unit and cylinder maintains belt pressure automatically. An electrically operated pressure governor adjusts the tension. A safety cut-out switch also keeps an automatic eye on the belt. If, for some reason, belt tension drops to a point where excessive belt slippage over the drive pulley takes place, the switch turns off the belt.

The digging ladder conveyor drive is mounted at the inner end of the ladder.

The digging ladder conveyor delivers the material to the stacker conveyor. The first 110 feet of stacker conveyor are supported in the machine's superstructure. The outer 175 feet are mounted on a structural stacker ladder. At its inner end, the ladder is pin-connected to the superstructure. The ladder

Piatt Mine superintendent is a veteran of the coal mining business, Byron Somers.

may be raised or lowered by a stacker ladder suspension tackle which supports the ladder at three points. Normal position for the stacker ladder is an incline of 15°.

The upper block of the suspension tackle is mounted at the head end of a structural stacker gantry. The top of the gantry is the machine's highest point. It is approximately 140 feet from that point to the coal bed.

Machinery for raising and lowering the height of the outer end of the stacker ladder is mounted on the revolving frame. The drive machinery for the conveyor itself is located on the superstructure just below the ladder's pin-connection point.

The stacker conveyor is similar in construction to the digging ladder conveyor. The 12-inch rubber covered impact carriers run the full length of the loading zone. Seven-inch steel idlers are employed for the remainder of the stacker. Spacing of the impact rollers is the same as for the digging ladder. Spacing of the steel rollers increases from 18 to 24 inches as the belt goes from inner end to outer end.

All major drive units of the machine are DC mill type motors and they are

Ward Leonard controlled. A 187½ hp General Electric motor is the standard power unit throughout, except for swing. One of these units is used on each of the following: wheel drive, digging ladder, hoist machinery, and digging ladder conveyor drive. The stacker conveyor drive has two motors of this size.

Two 800-hp motor-driven generator sets furnish power to these motor units. The generator sets are likewise of General Electric manufacture. One is mounted at each end of the revolving frame for better weight distribution.

Maintenance and repair cranes are located on the machine at several points to simplify these functions. Two 4-ton traveling cranes are mounted over the machinery on the revolving frame. One 4-ton traveling crane is mounted over the stacker conveyor drive. A 5-ton swinging derrick with live boom is mounted on top of the digging ladder gantry. A 2-drum auxiliary winch is mounted in the superstructure.

The operating crew of the wheel excavator is the same as that of a large dragline or stripping shovel: an operator, an oiler and a ground man. The operating controls are in the operator's cab, located in the superstructure approximately 60 feet above the ground. At this elevation, the operator enjoys an excellent panoramic view of the work area.

There are a number of design and operational advantages which the wheel excavator boasts. These can prove valuable to the strip mine owners.

One of the advantages which is apparent from looking at the machine is the exceptional reach of the stacker boom. The distance from the center of rotation to the end of the stacker is 225 feet. Being able to drop the spoil that far back can be very valuable in the pit. The spoil may be deposited back as far as three shovel spoil piles.

Room for Shovel

There is plenty of room for a large stripping shovel to spoil the remaining 29 feet of overburden. In fact there is enough room so that the shovel operator need not slow his speed to drop the material carefully in order to avoid a slide. He can dump his load while still in the swing.

The wheel spreads the spoil out in a continuous arc. The material it spreads has been pretty thoroughly chopped up. The stacker does not drop large chunks from a height as the shovel or dragline does. In laying the spoil down gently, the wheel excavator reduces, in fact almost eliminates, the chances of causing a slide in the spoil pile.

Since the wheel is a continuous excavating machine as contrasted with an intermittent-digging machine like the shovel or dragline, it requires an even power input. There are no extreme peak loads as with the shovel and dragline. The load on structures and machinery units is even too, minus peak demands. This promotes long life and low maintenance.

There is no heavy, non-productive counterweight on the wheel excavator. Front-end and rear-end equipment balance each other, keeping weight low. And, of course, the digging and stacking swing directly opposite each other so the machine is always in balance.

Even the way the wheel digs into the overburden is gentle, compared with a shovel.

The wheel excavator leaves a wide

Stripping with the wheel excavator is this 30-yard Bucyrus-Erie shovel. It shovels out the bottom 29 feet of overburden.

pit where it works. There is ample room for stripping shovel, loader and trucks to maneuver. At Truax-Traer, the wheel was leaving a 100-foot wide pit. The loader was taking out half of this. Spoil is kept far enough back from the coal berm so that all coal is recovered. There is no rib left.

Even the arc pattern maintained by the stacker is an asset. Instead of dropping material between two piles and placing additional weight on both as another excavator might do, the wheel spreads an even ribbon of dirt crosswise across the piles. It ties them together instead of tending to spread them apart.

And, of course, the big advantage of the wheel is that it handles deep overburden with ease. Byron Somers says, "The wheel is the answer to deeper overburden removal at reasonable cost."

Excavating Engineer visited the wheel excavator in March. *(By the way, the Truax-Traer management extends an invitation to interested parties to visit the wheel and see it work. Just take Highway 9 out of Canton, Illinois, to Fiatt where the mine is located. The wheel works 24 hours a day, 7 days a week.)*

We climbed aboard the big machine with our cameras and equipment. The manufacturer has provided a network of walkways and railings which will lead you to any part of the machine.

The first thing you notice is that there is almost no vibration. The big excavator works smoothly and with very little noise. You can walk along any of the walkways without using the handrail, if your stomach is up to it. Electric power, of course, makes the work quiet.

We hiked up to the operator's cab. It is approximately the height of a six-story building. It was a chilly day but the inside of the cab was warm with heat provided by an electric heater, part of the machine. The operator, who sits on an upholstered leather seat, has a Cinemascope view of the overburden high wall. Windows at the rear of the cab give him full view of the spoil discharge.

Easy Does It

A number of small jokes are circulating the pit concerning the operator's job on the wheel excavator. They say it is an old man's job or that he has to back up to receive his pay check now. Though these are only jokes, they do emphasize the ease of operation of the big machine. One of the operators we talked with said he didn't like the job at first because there was not enough to do. The wheel excavator didn't hold his attention the way the dragline did.

In the operator's cab are the following six lever controls: (1.) stacker conveyor, controls speed; (2.) ladder conveyor, controls speed; (3.) swing; (4.) wheel, controls speed and power; (5.) ladder hoist; (6.) crowd, has only one speed forward and controls the only AC motor in the lot.

The operator's main occupation is with the swing lever. He must, of course, adjust the others from time to time—to crowd the machine in, for example. But his most constant activity is fanning the wheel back and forth. The other five levers receive very little attention. The speed of both the conveyor and wheel are normally kept constant. The almost automatic operation of the machine is the root of the jokes circulating the pit.

When the wheel gets too low, near the cutout point, a horn sounds in the cab. Another horn is at the operator's command for warning pit crews that operation will resume.

Two "instruments" are the only ones in the cab. One is a DC ammeter which registers the power output of the machine. The second instrument is a recorder which makes a continuous record of the machine's power consumption. The record it makes gives the mine superintendent exact information on how much time the machine is down. This is correlated with a quarter-hourly log kept by the operator. In the log, the operator jots down the reason for any down time. Although the wheel began working at the worst time of year—the threshold of winter — it has averaged 75% productive time. This high average was established during a break-in period when a new machine is stopped on the slightest provocation so as not to take a chance with it. To an experienced hand the recorder likewise indicates how much dirt the wheel excavator is moving. The amount of power consumed is directly related to the amount of dirt

Slope sheet's revolving wiper helps prevent dirt build-up. Digging ladder gantry's 5-ton derrick is one of several service cranes.

At Fiatt, machine handled up to 75 feet of overburden. Excavator can undermine even deeper overburden and drop it into wheel.

being excavated.

The wheel was in 55-foot deep overburden. A thousand feet farther along, the seam dipped and the terrain rose to present a stretch of 75-foot overburden. The average for the field was given as 60 feet. Composition was loam, clay, hardpan and shale. The upper strata which the wheel removed was mostly loam and clay. Below the wheel's limit ran a level shale layer which the shovel stripped.

The wheel made the job look easy as it spewed the pulverized dirt out behind it. The machine left a level, clean, even-faced shelf in the overburden.

The wheel alone cannot strip mine coal. The lower 29 feet of cover must be shoveled out. In this pit—called the 950-B pit—a Bucyrus-Erie 950-B 30-yard stripping shovel worked behind the machine. The shovel spoiled to a pile between the wheel excavator and a previous spoil pile.

A quarter mile down the pit, a 7-yard Bucyrus-Erie 100-B shovel was loading out the 4½ to 5-foot thick Illinois No. 5 coal seam. The mine's hauling fleet consists of 22 Euclid wagons and semis. The coal haulers vary in capacity from 20 to 35 tons. Haul roads are in excellent shape and the average haul distance is 3 miles.

Output of the Truax-Traer Fiatt mine is 7,000 tons per day. To obtain this production, the operators exploit three pits. In addition to the 950-B pit where the wheel works, there are two others. One is the "easy" coal pit near Highway 9. Here coal is stripped by a 17-yard Bucyrus-Erie 750-B shovel and loaded out by a five-yard Bucyrus-Erie 75-B loading shovel.

A third pit is equipped with a Bucyrus-Erie 9-W walking dragline with 10-yard bucket for stripping and a second

Continued on page 56

A 7-yard Bucyrus-Erie loader and fleet of Euclid coal haulers move coal from seam.

Spread picks up Romona Freeway fill. Cat D8 pulls Sierra loader in Monterey Park pit to load Mack-drawn Cook semi-trailer.

Kiewit Solves Freeway Problems

by Ray Day

Contractor develops vertical auger rigs for hole excavation when successful bid lands Ramona Freeway job with its structure foundation problems. Speedy cast-in-place piles result.

NEW cost savings in southern California's metropolitan freeway system may be in the offing, thanks to a contractor's ingenuity.

East of Los Angeles at El Monte, where a 3.96-mile section of Ramona Freeway is under construction for $6 million, Peter Kiewit Sons' Co. has introduced a vertical adaptation of auger boring to solve pressing structure foundation problems. Big 15½-in. diameter auger bits, driven by Eimco air motors, are being used to excavate what many contractors consider toughest digging of all—holes in the ground. The augers are long enough to drill to the bottom of a 55-ft. hole. They are being used on Bucyrus-Erie and Northwest cranes to construct drilled-in-place concrete piles, which form the substructure bearing foundation for bridges and undercrossings in the contract.

At the halfway point in the foundation work, the new development had proved up to the company's complete satisfaction, even though $60,000 had been invested in developing the necessary equipment. The first pilot models of the new-type auger had been improved on, so that the auger shaft is being used to place concrete for each pile as the auger bit is raised out of the ground. The speed of installing each unit had been improved upon. New economies in future foundation work of a similar nature are a virtual certainty, thanks to the combination of construction and oil field drilling ingenuity which produced the new rigs.

Worst Location In Freeway

In many respects the 3.96-mile section of Romona Freeway, on which the new machines were developed, is one of the most difficult pieces of location of the entire southern California freeway system. Before the final route for the over-all Ramona Freeway was settled, negotiations which lasted nearly three years were necessary between the City of El Monte and the California Division of Highways. Like many other parts of southern California's freeway system, this one passes through a heavy residential area. The $6 million price tag on Kiewit's contract indicates the high cost of real estate as California engineers secured the necessary 500-ft. right-of-way for such a traffic artery.

Further to complicate the situation was the necessity for carrying the freeway through large parts of El Monte on high fills. The job calls for nearly 2 million cubic yards of imported borrow material, which was necessary to construct 20-foot-high embankments. These fills tie directly in many cases to the abutments and wing walls of reinforced-concrete structures, which carry the freeway over existing streets in the city of El Monte and its environs.

The list of structures in this relatively short construction section gives an indication of the importance and size of the structure foundation job. Four reinforced-concrete structures were necessary to take care of Eaton Wash, including a frontage structure, a main line structure, a main line eastbound structure, and the south frontage. Undercrossing structures were necessary at Baldwin Avenue, Hoyt Avenue, Lexington Avenue, Tyler Avenue, Meeker Road, Peck Road, Exline Avenue, Cogswell Avenue, Durfee Avenue, and Garvey Avenue. A pedestrian undercrossing structure is being built at Utah Street. Overhead structures included the Gibson Avenue Overhead, a main bridge across Rio Hondo River, the Route 26-77 Separation Structure, and an overhead at East El Monte Avenue. All the freeway structures have been planned wide enough to accommodate the 40 and 52-ft. portland

Mojave Corporation's Caterpillar D8 crawler and No. 28 ripper team is shown as it loosens borrow pit ahead of the loader.

Southwest rollers, sheepsfoot left and rubber-tired right, build compaction. Crawler and rubber-mounted Cats are prime movers.

One-yard Northwest dragline loads Ford-drawn trailer to take down hill in heart of L. A. Excavated dirt will go into freeway.

When the 22-B operator reverses the auger, the spinning blades dump excavated dirt to the plywood cover placed over the hole. Kiewit crewmen shovel the material aside.

cement concrete paving which will divide east and westbound traffic lanes.

Foundation Problems Tough

In order to take care of live vertical traffic loads, as well as any possible lateral movement in the structures, excellent foundations had to be designed. In planning the concrete structures, design engineers used two types of piles on each side of a mid-point. Because of peculiar soils conditions, the Rio Hondo River bridge foundation and foundations for all structures west of that point consist of Raymond step taper metal pile shells, filled with concrete. There are approximately 1,600 such units. East of that point, covering the remainder of the structures, the Division of Highways permitted the use of drilled, cast-in-place concrete piles. There were approximately 3,025 such units in the east portion. In the case of drilled as well as driven piles, approximately 60% consisted of 1 on 3 batters, with the remaining 40% being driven vertically. Specifications called for a finished pile diameter of 16 inches, each unit driven to a bearing of from 35 to 45 tons. The cast-in-place concrete piles built by the drilled-in-place method had to stand up under exactly the same bearing tests which were applied to other piles. These test loads consist of 90 tons, applied by jacks, to each test pile. The 90-ton load is then held for a 60-hour time interval, during which the unit under test may deflect not more than ¼ inch. Test piles constructed by the new rigs have stood up beautifully when subjected to such loads.

Special Drill Rigs Built

The foundation job was big enough to warrant some experimentation with various types of drilling equipment. Several machines of various types were brought in and used for several days. Holes were put down under all the varying conditions inherent in the job, including drilling in clay, sand and river bottom boulders. The area through which the new freeway passes is a part of the huge alluvial fan which drops off from the base of canyons in the Sierra Madre mountain range nearby. Conditions are quite spotty in that alluvial fan, and practically everything from clay to boulders can be expected. Out of the initial drilling experiments came one conclusive indication. It seemed that some vertical adaptation of the horizon-

Batter piles are no problem to the auger which is here mounted on Bucyrus-Erie 22-B.

tal augering method might be developed which would speed up the work and eventually, perhaps on the next job, lower construction costs. Kiewit's management gave the necessary go-ahead.

The first machine built was assembled around a Bucyrus-Erie 22-B crawler crane, with a 35-ft. boom and standard drum and hoist equipment. Construction of the special drilling equipment was done for the most part in Kiewit's Arcadia shop. A 45-ft. set of hanging leads was built from standard angle steel, to carry the drilling equipment. On the front side of the leads was mounted a 15½-in. diameter auger screw which was direct connected to an Eimco compressed air motor of the type normally used for operating the Eimco mucker in tunnel excavation. The connection of this air motor to the auger screw gave normal drilling speeds of 45 rpm and a reversible kickoff speed of 70 rpm. Compressed air was furnished for this unit by a Gardner-Denver 500-cubic-foot-per-minute compressor, set a short distance away from the crane.

The leads and drilling equipment were then hooked to the Bucyrus-Erie 22-B by a heavy bolted connection between the crane's boom point and a point on the leads about ¾ of the way up. Cable rigging was then devised, which would permit the top of the leads to be pulled in, so that a batter pile could be driven easily. Other portions of the rigging consisted of an auger hoist line, handled by the back drum of the 22-B, and a small Gardner-Denver compressed air tugger for plumbing the leads with a pull on the bottom. Since all the drilled-in-place piles were from 20 to 44 feet deep, according to the footing, it was expected that this rig would take care of a goodly percentage of the work to be done.

For a first attempt, the machine worked successfully. There were a few bugs to work out, but their solution formed the basis of valuable knowledge which was used in building later rigs. For example, one of the worst problems was that of augering a batter pile. At extreme depths the point of the auger tended to drop down of its own weight, giving the finished pile some curvature at the bottom. This became apparent from the start, so the problem was solved by equipping the lower half of the auger bit with a half-diameter shield. That gave the bit some support against the bottom side of the hole.

Installation of the shields corrected the condition immediately, even though the shields do tend to wear out fast. The first shields were fabricated from ⅛-in. metal, but they wore out rapidly. ⅜-in. steel was then tried, and finally a switch was made to ¼-in. plate. Even so, in some of the more abrasive material the steel shields ¼-in. thick wear out in

Continued on page 38

Northwest-mounted and Bucyrus-Erie-mounted rigs sink holes. Eimco air motors fed by Gardner-Denver compressor turn screws.

170 cu. yds. per hour on 1600-ft. cycle

Tulsa contractor averages 170 cu. yds. hourly with TD-24s and B-250 INTERNATIONAL scrapers on 1600-ft. cycle while helping cut 24 per cent off length of Oklahoma highway

The D. W. Falls Construction Company of Tulsa holds the prime grading contract for 7.6 miles of Oklahoma State Route No. 20 between Hominy and Ralston. They were able to make cost-cutting short cuts in earthmoving operations on the project that cut travel distance 24 per cent by using three INTERNATIONAL TD-24 drawn B-250 scrapers moving 27 cubic yard-heaped loads, and push-loaded by a TD-24 crawler.

Take it from Supt. Bob Derington:

"It's really surprising how much dirt these big scrapers will move per day. Under fairly good working conditions, each unit gives me a day-after-day average of 170 cu. yds. of dirt an hour while working a 1,600-foot cycle."

You can get pay-off performance by hitching INTERNATIONAL scrapers to the TD-24—still the Champ of the crawlers with 161 drawbar horsepower. That's the kind of hook-up that loads, hauls and spreads faster than any other combination . . . day after day . . . year after year. Just call your INTERNATIONAL Industrial Power Distributor for demonstration proof. He'll bring the combination you specify anywhere, anytime so that you can see why INTERNATIONALS make every load a payload.

INTERNATIONAL HARVESTER COMPANY
CHICAGO 1, ILLINOIS

INTERNATIONAL
INDUSTRIAL POWER
MAKES EVERY LOAD A PAYLOAD

INTERNATIONAL HARVESTER

SMOOTH-WORKING TEAM. Four INTERNATIONAL TD-24 crawlers and three B-250 scrapers delivered a total of 510 cu. yds. hourly on the 1,600-foot cycle for D. W. Falls.

TD-24 POWER FRONT AND BACK PUTS these kinds of 27 cu. yd.-heaped loads in the INTERNATIONAL B-250 scraper in a matter of seconds for D. W. Falls on the company's 7.6-mile project requiring 250,000 cu. yds. of excavation.

EASY, FAST HAULING of heaped loads is assured with this equipment combination. The B-250 scraper requires minimum drawbar pull and has a low center of gravity that gives outstanding stability on side slopes like this.

Continued from page 35

approximately two weeks.

Another problem which cropped up early in the game was that of lubrication on the compressed air motors. The motors had really been built for use in a different position than vertical, so lubrication troubles cropped up immediately. The first motor was beefed up by installing a larger size oil pump and by making a few modifications on bearings. According to job officials, the manufacturer now is considering an excellent solution to that problem by putting into production a 25-hp five-cylinder radial air motor. It will have positive pressure lubrication, a hollow crank shaft and other new features, according to these officials. While Kiewit's mechanics handle such problems as lubrication regularly as a part of their business, the early solution on the first rig did take time.

All of the valuable refinements which were worked out later for two more similar rigs evolved from the use of this first 22-B mounted boring machine. The operation of the machine is relatively simple. Under its own crawler power, the 22-B, carrying its leads and drilling equipment, moves into position over a location stake set by California Division of Highways' surveyors. The leads are then positioned and leveled by an ingenious plumb bob arrangement. This home-made invention consists of a steel arm and pointer, which is three times the radius of a centering mark directly beneath. Bisecting the centering ring at the 90 degree points are two iron spokes, welded into the ring. They are centered in this ring exactly like the cross hairs of a telescope sight is positioned over a big-game rifle. When the pointer centers on the intersection of these steel "cross hairs," the leads are plumb and the hole is ready to dig. To drill a batter pile, the leads are simply pulled out by cable rigging until the point of the plumb bob centers over the centering ring. It's a simple homemade contraption, but it has worked beautifully and saved time.

These men made the new rigs a reality. From left to right: Project Manager Ward W. White, District Structural Engineer K. S. Goble, and Assistant Super H. A. Franklin.

Mojave's Superintendent Paul D. Harris inspects dirt taken on by the Sierra loader.

In drilling a hole with this first rig, the auger is rotated by the Eimco air motor until it digs in approximately 12 feet. At that point, the auger is raised by the 22-B crane operator until its point just clears the top of the hole. A piece of heavy plywood is then thrown over the hole by the ground crew, and the crane operator quickly reverses the screw to discharge all the dirt which has been brought up. This is shoveled

One of Kiewit's D8's with Caterpillar scraper works on freeway at boring stage. Machine stockpiles topsoil for later re-use.

away by the ground crew or removed by a small Ferguson loader. The piece of plywood is removed, and the process is then repeated. After several such cycles, the hole is excavated and ready for concrete.

Concrete has been placed shortly after the drilling of the hole by truck mixers, hauling from a nearby San Gabriel Valley commercial plant. When the concrete reaches a point within 12 feet of the top of the pile, a prefabbed reinforcing steel mandrel is set in place, and the final 12 feet of concrete then is chuted in to complete the unit.

This first rig, however, did not have all the performance characteristics which job officials wished for. For example, a longer set of leads was needed to drill deeper holes.

A second machine built similarly and with practically the same equipment was constructed around a Model 25 Northwest crawler crane. The leads in this case were 58 feet long, with the same type Eimco motor and the same type auger screw. A 500-cfm Gardner-Denver compressor also was used on this rig. It worked successfully, proving at least that a longer auger screw was possible. Even in some of the boulder formations, where large rocks tended to wedge between the auger screw and the shield, the Eimco motor did its job without lugging down too much. Both the Bucyrus-Erie 22-B and the Northwest Model 6 were equipped with Kohler light plants for double-shift work at night.

Third Rig Needed

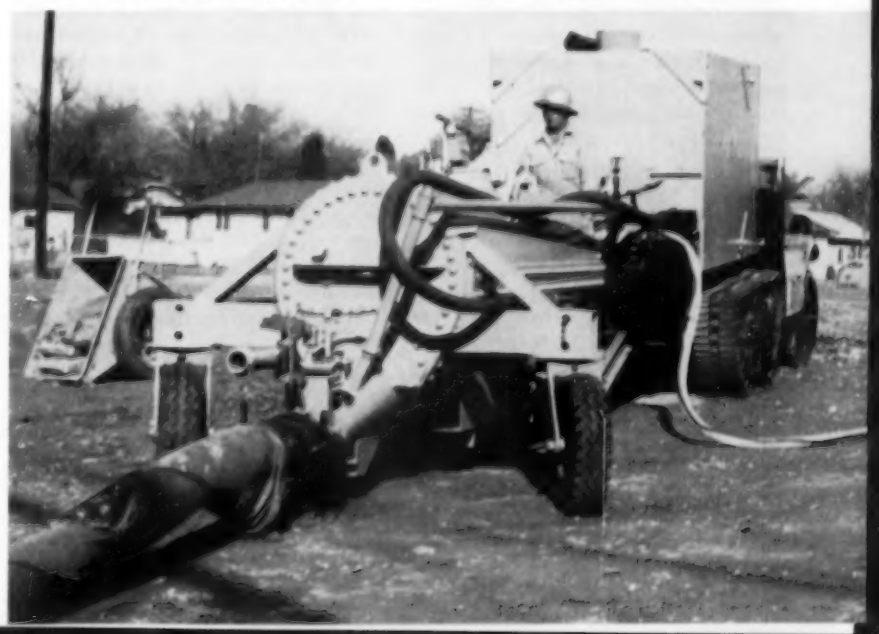
Peter Kiewit's field management, however, decided that construction of a third machine built even bigger and to more efficient standards was needed. One of the tantalizing possibilities which some of these men had in mind was the possibility of placing the concrete right down through the center of the auger hub as the auger was withdrawn from the digging operation.

The new machine was to be heavier all the way around with a set of leads 62 feet long. It was built around a Northwest Model 6. Although the auger was of 15½-in. diameter, the same as those on the other rigs, it was built with a hollow shaft . . . so concrete could be placed under pressure while the auger was still in the ground!

A digging point was finally perfected, using the reverse-pitch principle of drilling common to the oil fields for many years, which prevented dirt from entering the bottom of the opening. Speeds on the new rig also were changed, so that the unit drills at 30 rpm and cleans its screw in reverse gear at 80 rpm. The unit is equipped with an 18-hp Eimco five-cylinder radial air motor, and it is expected that this power will be replaced as soon as the newer 25-hp engine becomes available.

The rig has a traveling stiffening guide on its leads which braces the auger at approximately the halfway point. This stiffening guide is welded to a twin set of guide rods which permits the unit to slide down the leads coming to a stop on the oil-well kelley table when the auger is halfway in the ground. The Eimco engine drives the auger through a General Motors transmission box, equipped with a two-speed air-shifter transmission device. The new leads were made from Cor Ten steel, giving added

Concrete pressure pot with crazy wheel mounting, and drawn by an Athey halftrack, is used to put pile concrete in the ground under 150 pounds pressure per square inch.



Welder and helpers pre-assemble Raymond step taper pile shells. Piles step to bigger diameters as they go from bottom to top.

strength in case the framework is ever used for part of a dragline or crane boom. Pieces of steel also were welded crosswise on one side of the frame for ladder rungs. That makes the machinery accessible for oilers and a leadsman.

One of the unusual problems worked out in the new machine was a swivel joint which would permit the auger bit to turn and would still be mortar-tight when concrete was placed under pressure. That problem was solved by again calling on the oil field industry. At Brea, Calif., Kiewit's builders found a Chiksan swivel joint. It is used in oil drilling to do the same basic job, using drill mud under pressure instead of concrete. The joint was brought in and installed on a gooseneck connection, which has a quick coupler and flexible multiple-ply hose for the delivery of concrete.

In drilling a hole this auger is not normally pulled from the ground in the manner used by the other rigs. The auger has been sufficiently stiffened so that no shield will be necessary, even in drilling batter piles. The machine can simply sock in and start to drill. As it works, excavated material flows up the auger blades and builds up at ground surface. A small surface crew, or a Ferguson front-end loader can quickly take this dirt away. When the auger is in to its projected depth, an automatic stop device has been worked out which will prevent further penetration. The auger can thus continue to spin until dirt has ceased to move to the top of the ground.

At this point, the pressure injection of concrete will begin. Kiewit's ingenuity again came into being with a creation of a pressure receptacle somewhat larger than normal. In a Lynwood steel fabricating shop, a three-cubic-yard pressure pot was built from heavy steel stock. One end of this pressure pot is direct connected to an Athey half-track, while the other end is mounted on "crazy wheels," so that it can be maneuvered in close to the auger screw. The Athey half-track carries an 800 gallon water tank, which will be used under pump pressure to clean the pot at lunch and quitting time.

Charge Pressure Pot

The pressure pot is charged by dumping from a truck mixer the exact amount of concrete needed to fill a pile hole to within approximately 12 feet of ground surface. The top lid is then clamped shut, and the placing operation begins under control of the pressure pot operator. Compressed air from the Gardner-Denver 500-cfm compressor, used on the drill rig, flows through a T connection into the pressure pot and pushes the concrete up the connected hose over the gooseneck and down through the auger center. Under approximately 150-psi pressure, the concrete fills up dense and solid until it jams against the auger blades.

During this operation, the auger is under control of the pressure pot operator. He raises the auger slowly and finishes injecting the concrete under pressure. A pressure gauge on a dash before him lets him know exactly what the concrete is doing down in the hole in relation to the auger point. In other words, a reading of 150 pounds pressure on the gauge before him is proof that the concrete has built up tight against the auger blade and the time has come to raise that unit. When the unit is raised, of course, the pressure drops until enough concrete has again been injected to build up against the device.

It's a fast operation, with the pressure pot operator raising the auger almost simultaneously with the injection of

concrete. By metering the exact amount of concrete needed, it is possible to have the line clean when the concrete gets to within 10 or 12 feet of the top of the ground.

At that point the pressure pot operator's work is finished on that unit. The crane operator then takes over and raises the auger bit the remaining distance to clear the hole. A piece of plywood then is placed over to cover the hole so the concrete is protected, the auger is reversed to clean the blades, and the dirt is cleared away.

The prefabbed top mandrel of reinforcing steel then is brought in and set in place for the top part of the hole. The top 12 feet of concrete then is placed directly by chutes from a truck mixer.

Final development of this rig had just concluded shortly before this piece was written. But the new unit seemed to be remarkably free from bugs, thanks to what had been learned on the previous rigs, and there was every indication that the ultimate in an ingenious new machine had been achieved. According to project officials, patent searches were underway to give the new process protection.

As the crew becomes more and more familiar with the new technique, increasing efficiency seems likely. To use every working minute of a shift to best advantage, the operator of the pressure pot and the oiler for the Model 6 Northwest crane show up ½ hour early at the start of the day shift. These two men perform all necessary lubrication, start the air compressor so that it can warm up, and have everything ready to go when the crew arrives.

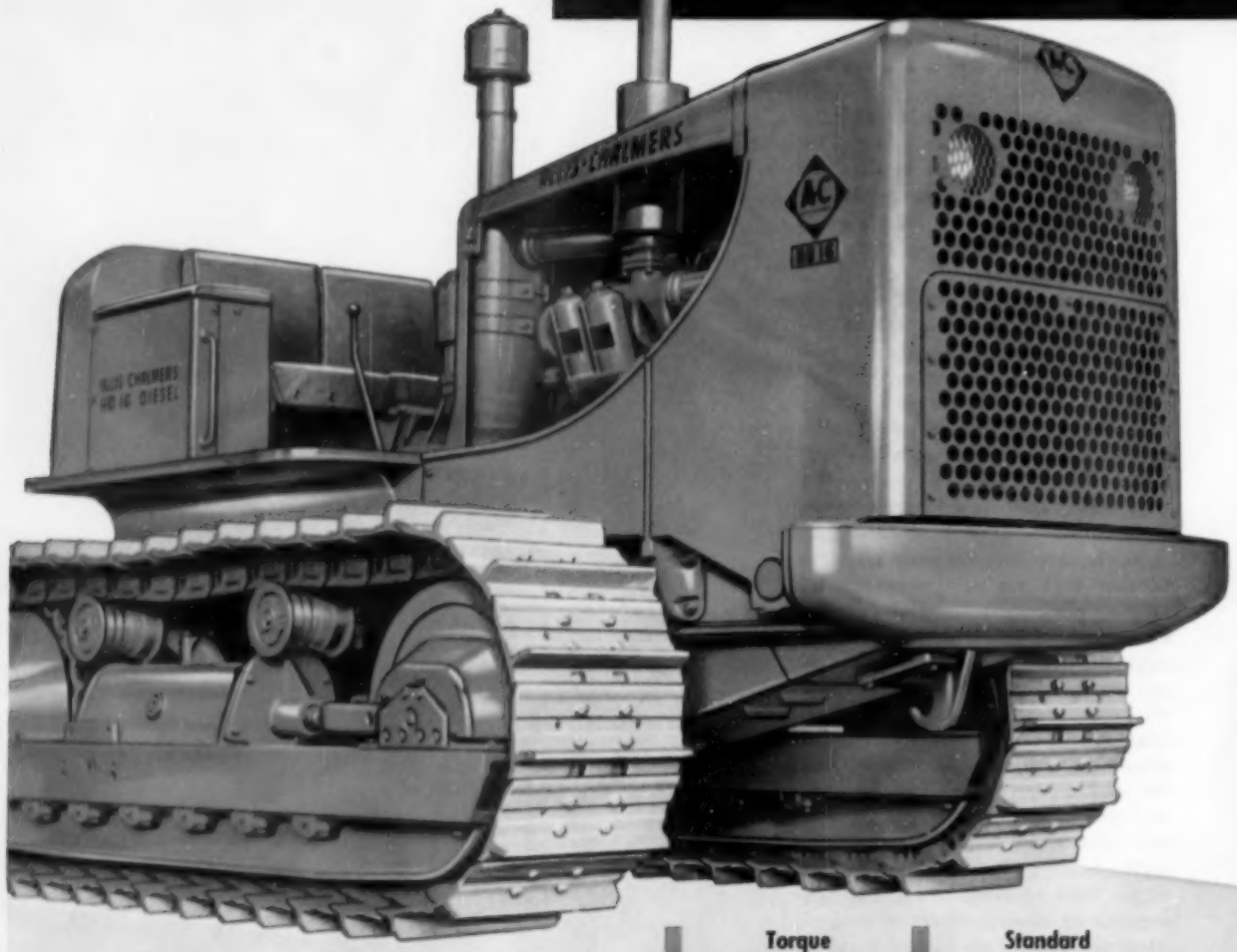
The new rig is expected to solve one of the worst problems of a drilled footing: caving along the sides in marginal material. During the early stages of auger excavation development, for example, there was considerable caving which was fought by various means. Some experimenting was even done with chemicals in an effort to stabilize the sides and bottom of a hole prior to placing concrete. The cost of this operation, however, was prohibitive. The new rig's solution of that problem is pleasing both to the contractor and to representatives of the California Division of Highways.

From the Rio Hondo Bridge west throughout the remaining structures on that end of the job, the pile foundation consisted of step taper steel pile units,

Continued on page 60

Both driven and drilled type piles were used on the freeway. This steam-actuated rig drove Raymond step taper piles through Rio Hondo Bridge approach embankment.

Allis-Chalmers presents the NEW HD-16



Your choice of two outstanding drives

	Torque Converter Drive	Standard Transmission Drive
Horsepower	150 net engine hp	131 belt hp
Weight	31,600 lb	31,500 lb
Drawbar pull	up to 60,000 lb	up to 35,945 lb

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

NEW STANDARDS OF PERFORMANCE

for a wide range of heavy-duty work

Set your sights on an HD-16! This big new tractor not only brings you *more* power for bigger jobs . . . it makes more effective use of horsepower, with a brand new Allis-Chalmers diesel engine and your choice of two new drives — the job-proved torque converter or the easy-shift standard transmission. Either way, the HD-16 brings you a new high in tractor-operator efficiency . . . a new high in work done under even the toughest conditions.

NEW STANDARDS OF DEPENDABILITY AND LONG LIFE

under *all* conditions!

The HD-16 follows the Allis-Chalmers *advanced basic design*, with such important features as its all-steel, Box-A main frame and one-piece steering clutch and final drive case . . . straddle-mounted final-drive gears with tapered roller bearings . . . unit construction . . . simplified lubrication and service designed with *better* maintenance in mind. What's more, it is newly engineered throughout to provide big safety factors in all components . . . plus outstanding new features like the new Allis-Chalmers heavy-duty diesel engine, new "wrap-around" radiator guard, husky new transmissions, new true-dimension track, and many others.

All in all, the new Allis-Chalmers HD-16 brings you an outstanding combination of performance and long life with both mounted and drawn equipment . . . a higher rate of production, more working time, more work done, LOWERED JOB COSTS. You OWE it to yourself to get all the facts now from your nearby Allis-Chalmers dealer.

Academy Project Begins Shortly

Engineers obtained soil information from this 30 foot deep pit they dug at Air Force Academy site. The low boy in bottom of pit supported load bearing test instruments.

Construction of $125 million air force school at Colorado Springs, Colo., expected to begin in June. Oklahoma engineers run soil tests. Excavation may be completed by end of the year.

CONSTRUCTION equipment already has been employed on the site of the new $125 million Air Force Academy, six miles north of Colorado Springs, Colo. The equipment was used to help obtain data on soil and foundation conditions which will confront contractors.

For more than a month early this year, soil engineers of the Oklahoma Testing Laboratories, Oklahoma City, Okla., ran a variety of tests where the runway, taxi strips, apron and other portions of the airfield are to be located. OTL is under contract to Skidmore, Owings, and Merrill of Chicago, architects-engineers for the Academy project.

Information from the tests was included in the specifications listed in advertisements scheduled for April requesting initial bids on the excavating and earthmoving for the site, construction of certain utilities and the road system. Awarding of bids was expected to be made in May, with construction probably starting in June.

The airfield will include a runway 8,800 x 200 feet, aircraft hangers, maintenance facilities and a parking area for about 30 T-29 navigational trainers and administrative aircraft.

OTL dug seven large test pits, six to 30 feet deep, to obtain information on the type of soil and the fill material available. The Oklahoma firm leased a Caterpillar D8 tractor with bulldozer and a Cat DW10 tractor-scraper from the L. H. Kilgroe Construction Co., Denver, for the digging. The bulldozer did most of the work, but the DW10 was used extensively in the bigger pits to haul and windrow the material along the pit's edge so that the hole could be backfilled more easily.

After the pits were dug, a low boy heavily loaded with sandbags was driven to the bottom of the pit as support for instruments performing load bearing tests on the soil at various depths. Sieve analysis and densities tests were conducted. The California bearing ratio was determined to discover the type of flexible and non-flexible pavements best suited for the soil.

Across U.S. route 85-87 from the 30-foot pit, the D8, DW10, a Cat No. 12 motor grader and a Grace rubber-tired compactor were used for compaction tests. Engineers spread soil from a nearby borrow pit over an area about 35 x 60 feet and about a foot deep. The area was divided into three sections of sand with moisture of varying degrees. These sections were thoroughly mixed.

After one layer was complete, the compactor, with a total load of 100,000 pounds, was hauled over the soil eight times to obtain maximum compaction. This process was repeated three times with new layers of soil, providing a total of 36 inches of compacted soil in which inplace density, sieve analysis, plate bearing and California bearing ratio tests were run.

The Air Force Academy Construction Agency, directed by Col. Albert E. Stoltz, is located in Colorado Springs to supervise planning, designing and construction of the Academy. The AFACA feels that excavation and earthmoving on the airfield area and the road system and construction of some utilities will be completed by the end of 1955.

Structural work is scheduled to start early in 1956. Approximately 1,000 people are expected to be working on the project during 1955. At peak pro-

Grace compactor, loaded to 100,000 pounds, is pulled over a layer of soil by a Caterpillar D8 tractor in compaction testing.

duction, in about two years, about 5,000 persons may be employed. In most instances, the prime contractor will be responsible for all labor, materials and supplies.

The Academy, located on 17,000 acres of land, will rate with the established service schools, West Point and Annapolis.

The Air Academy will have a student body of 2,600 cadets and an overall personnel complement of about 5,000 when in full operation. Facilities will include: cadet area, embracing academic and athletic structures, living quarters, chapel, PX, dispensary and theatre, among other things; airfield; maneuver area; and a housing area, including single family dwellings for dependents of key personnel.

The first class of 300 cadets will start sessions on the 1st of July at an interim site, Lowry Field in Denver. The permanent installation is expected to be completed sufficiently to handle the first three classes of cadets by fall, 1957.

Lt. Gen. Hubert R. Harmon is Academy superintendent.

Engineers Tom Wallace (left) and Allen Murdock check moisture content of soil used in compaction test run. Academy site is six miles north of Colorado Springs, Colo.

News from the Field

Allis-Chalmers HD-15 with Gar Wood dozer stock-piles fill dredged from Delaware river off Philadelphia. J. Armour, Inc., is laying new road bed for Pennsylvania RR.

AGC Is Optimistic

A spirit of conservative optimism for the immediate and distant future of construction prevailed at the 36th annual convention of the Associated General Contractors of America in New Orleans, La., in March.

These points stood out after speeches and discussions: (1) Construction is booming. A 10th straight record-breaking year is forecast for 1955. The long-range outlook is for a continuing high rate of activity. There are huge backlogs of accumulated needs, especially in highways, schools, water and sewerage systems and other community facilities. (2) Competition among contractors, is increasing. Bid prices are dropping and the average number of bidders increasing. Many contracts are being awarded on bids below engineers' estimates. This intense competition for new work injected a firm note of caution at the convention.

The consensus seemed to be that the industry would take on much more work, but that it must exercise sound business prudence to see that the work is not done at diminishing return, to protect its own and the public welfare.

Contractors at the meeting saw results of the February AGC nationwide survey of conditions in the industry. Most of the survey replies, covering prospects for the next six months, anticipated increases in the major categories of construction—building, highway and heavy engineering activities. The replies said, however, that competition for contracts would be increasingly keen, with bid prices continuing to decrease.

The survey also indicated that material and equipment prices would remain comparatively stable during the next six months, but with continued tendency for wage rates to rise.

New officers of the association, which embraces more than 6,500 leading contractors of the United States and Alaska who perform more than 80% of the nation's contract construction, were installed. They were:

President, George C. Koss, Des Moines, Iowa; vice president, Frank J. Rooney, Miami, Fla.; secretary-treasurer, William Muirhead, Durham, N. C. (re-elected).

John MacLeod of Paramount, Calif., retiring AGC president, called for further development of the AGC's "program for constructive leadership in the industry." He said that the total volume of construction would account for about one of every seven dollars spent in the nation for goods and services and for about 15% of the jobs for the gainfully employed.

"Even though we will establish a record for new construction this year of $40 billion, we must look forward to the time when the growth of the nation will require $60 billion annually in new construction," said MacLeod.

A sales construction volume of about $56 billion in 1955—$40 billion in new construction and $16 billion in maintenance and repair activities—was forecast by managing director H. E. Foreman, Washington, D. C., in his annual report. Last year's record construction volume was $52 billion—$37.2 billion in new facilities and about $15 billion in maintenance and repair. Foreman predicted an increase in construction activity to $75 billion annually by 1965.

The AGC's 37th annual convention will be held Feb. 13-16, 1956 in New York City.

Portable light towers, powered by Kohler electric plants, speed air field project.

Light Towers Speed Work

Improvision of eight portable light towers has enabled two contractors to keep 450 men at work in two eight-hour shifts on construction of a jet air field near Portsmouth, N. H., for the United States Air Force Strategic Air Command.

Grading and paving contracts for the $46 million base were awarded the Morrison-Knudsen Co., Inc., Boise, Idaho, and Landers & Griffin Co., Portsmouth, N. H. They had to move 4,500,000 cubic yards of excavation in a short period.

To keep as much manpower as possible assigned to available equipment, the contractors improvised the light towers. Each tower is mounted on four wheels and houses a 10 kw electric plant man-

Continued on page 48

How P&H ELECTRIC SHOVELS cut tonnage costs with these two great features:

ELECTRONIC CONTROL — provides marked advantages over any other type of control available on electric shovels today. It's far easier, of course, and completely effortless. *Fatigue factor at end of shift is hardly discernible.* Response is faster. It is applied to all operating functions and arranged so the operator has co-ordination to get the utmost out of his shovel. Comparative tests indicate cycles 10% faster.

MAGNETORQUE* HOIST DRIVE — the electro-magnetic power transmission that provides faster dipper speeds at heavier bail pull. Higher torque is automatically produced at low speeds and vice versa. It enables you to come through the toughest banks with the smooth surge of power where other dippers falter or stall. It means extra production. Inherent slip characteristics cushion machine from impact stresses. Magnetorque is friction-free, worry-free; proved in over 1000 installations.

These two P&H exclusive features team up with many other advancements to give you still lower production costs in all kinds of open pit work. We have facts that speak volumes. You should have them. Write us. Ask to see the movie "Magnetorque Hoist Drive." P&H Electric Shovel Division, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

**T.M. of Harnischfeger Corporation for electro-magnetic type coupling.*

HARNISCHFEGER

the P&H Line

News . . .

Continued from page 46

ufactured by the Kohler Co., Kohler, Wis. Eight 1000 watt lamps surmount each tower.

The towers can be hitched to trucks and easily pulled to new locations in a matter of minutes. And distances are great on this job: the main runway is two miles long, the four taxiways 900 feet long and about ⅔ mile apart and the parking apron is 8,300 feet long and 1,000 feet wide.

The Kohler 10M61 generators employed have a capacity of 10,000 watts and operate at 115/230 volts. They use gasoline for fuel; operate at 1,200 rpm.

Big Dredges Moved

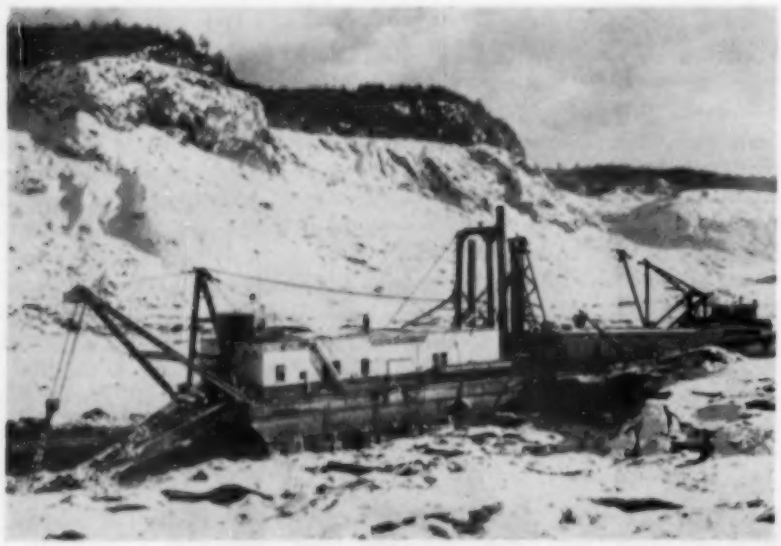
A mammoth portage operation, involving two 900-ton dredges and related equipment, an 8 to 10% icy upgrade of 1,500 ft. and severe Canadian weather, was begun in late winter. The project, involving an overland move of about two miles, was being executed by Construction Aggregates Corp., Chicago, Ill.

The two dredges, "Steep Rock" and "Marmion," had been working at Steep Rock Lake, Ont., removing 55 million tons of overburden from an ore deposit. The new location has a similar deposit.

"Steep Rock" already has been relocated. Early portage work was done over an icy ore haul-road in temperatures as low as minus 20°.

The move was made possible by attaching three sets of undercarriages from crawler cranes to the bottom of the dredges. The hoisting machinery aboard each dredge, augmented by pushing and pulling tractors, supplied power. The hoisting machinery operated through a system of blocks attached to anchor chain and secured to deadmen imbedded in rock alongside the upgrade route.

Movement to conform to road variations was provided for in large pintle bearings which transferred the weight of each dredge to the crawler units. Turning was allowed by tongues fastened to the crawler frames and operated by steam boat ratchets secured to the dredges' hulls.



Mounted on blocks, dredges Steep Rock and Marmion take two mile portage across icy terrain at Steep Rock Lake. Job is done by Construction Aggregates Corp.

Trucks Tired Tubelessly

Goodyear Tire & Rubber Co., Akron, Ohio, recently began a full tubeless truck tire program, extending this feature through its entire line of tires.

Goodyear could extend the tubeless tire to all types of work vehicles because of two developments, said the company. The first was the 3-T triple-tempering cord process that enabled the building of an integrally air-tight tire without a tube-like liner and in the same price levels as conventional passenger and tire tube combinations.

The second development was the creation of a new family of airlocking rims on which all sizes of truck tires can be mounted easily and quickly. Goodyear engineers developed a new rim. It is of three pieces with a small rubber ring which locks in the air.

The tubeless tire for the new rim presented no design problems. It is the same as conventional truck tires, except for a very slight change in bead base shape. Goodyear is developing the rim for all sizes of tubeless truck tires.

Tubeless tires easily fall over base of Goodyear rims, form airtight container.

A feature of the air-tight combination for passenger cars is the drop-center rim to which the tire beads make a firm air seal. This can, and has been, extended to small truck tires using the same drop-center rims. A modification of the drop-center combination can be extended to larger truck tire sizes without change in wheel diameters or complicating brake designs, by the use of a somewhat shorter section tire.

The extent to which such a structure can be carried into larger sizes is determined partly by mounting difficulties and partly by over-all economics.

E. J. Thomas, Goodyear president, called the new development "the greatest contribution to the huge trucking industry since Goodyear first put trucks on pneumatic tires in World War I."

Van Zee Heads ICEI

B. G. Van Zee, chief engineer of the automotive engineering division of the Minneapolis-Moline Co., Minneapolis, Minn., recently was elected president of the Internal Combustion Engine Institute. The Institute represents manufacturers in the high-speed gasoline and diesel engine fields.

Also elected were; vice president, E. Don Tull, vice president and general manager, Cummins Engine Co., Inc., Columbus, Ind.; secretary, H. W. Smith, consulting engineer, engine division of Caterpillar Tractor Co., Peoria, Ill.; and treasurer, Phil Norton, vice president in charge of sales, Wisconsin Motor Corp., Milwaukee, Wis.

Maximum efficiency, minimum maintenance assured by TORCON® blade design

A major factor in the uniform high efficiency of Torcon converters is the true Hydra-Foil blade design—a patented feature. The correct combination of blade contour and blade angle assures a smooth flow of maximum power; and eliminates turbulence—a cause of loss of efficiency and wear.

The Clark-Torcon is a complete unit, mass-produced, available off-the-shelf to engine and original equipment manufacturers, and to owners and operators. It's the broadest line, with a wide range of wheel diameters and a complete choice of options, for easy fitting into any torque-transmission system.

There's a Torcon to FIT YOUR NEED

Send for this bulletin.

Well illustrated, easy-to-read, this bulletin will provide a better understanding of torque multiplication and the many industrial power uses to which it is applicable. Use the coupon—no obligation.

Note These Quality Features of the Clark-Torcon Line—

- **True Hydra-Foil Blade** . . . blade contour and blade angle designed for maximum power and high multiplying efficiency
- **No Cavitation** . . . proper oil flow prevents turbulence and the formation of air pockets—a major cause of efficiency loss and wear
- **High efficiency over wide range** . . . produces more work and reduces wear on components
- **Most accessible unit** . . . inspection plates easily accessible; no special tools needed for service
- **Self-contained oil circuit** . . . sump is an integral part of unit. Oil passages cored in housing—no unnecessary fittings, hoses; no leakage, no external oil seals under pressure
- **Individually cast single piece elements** . . . no welds or fabrications to distort under extreme loads
- **A complete line** . . . 15 to 600 H.P.
- **Broad line of options** . . . readily adaptable to a wide range of applications:

Excavator cranes • Oil drilling rigs • Heavy duty trucks and buses • Tractor shovels • Grading machines • Logging equipment • Locomotives

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY, Jackson 5, Michigan: Please send the CLARK-TORCON Bulletin

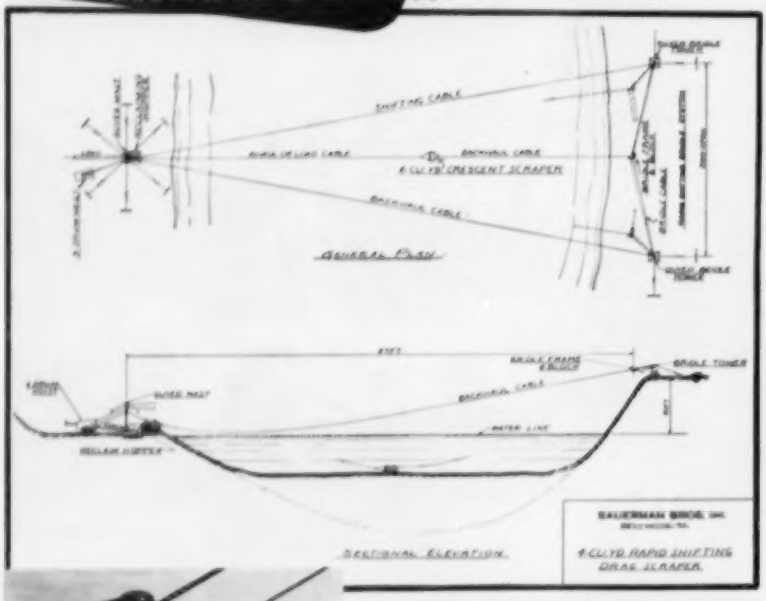
Name_____ Position_____

Firm_____ Address_____

City_____ Zone_____ State_____

the SAUERMAN METHOD.....

Scraper Machines Engineered to Your Operation



Above drawing was prepared for a specific drag scraper installation and does not represent maximum spans.

View shows rapid shifting bridle frame and all operating cables. Crescent may be seen in background conveying load to reclaiming hopper just in front of mast.

•

Contact Sauerman's engineering department for specific recommendations and information. No obligation.

Ask for Catalog A, Drag Scrapers—24 pages of job photos and specifications. Request Field Reports showing your material being handled by the low cost Sauerman Method.

The Sauerman Method works equally well over widely differing areas and span limits . . . on hills, swampy ground or underwater . . . handles any material a dragline can dig.

Every scraper machine is powered by a Sauerman Roller Bearing Hoist, especially designed to withstand sudden shocks and changes in speed.

When a rapid shifter is used, a third hoist drum is added to shift the bridle frame. The rapid-shifting bridle system (upper right of drawing) permits frequent shifting of the scraper's line of operation in non-caving material, shallow excavations or overburden.

Operating costs are lower—basically, it is cheaper to drag material than it is to lift and transport it. You eliminate the power costs of moving heavy machinery about the area. You pay only for pay loads—not dead weight. When expendable parts—sheaves, clutch or brake linings—are replaced, the machine is restored to practically new condition.

Sauerman can help you select the method of materials handling most profitable for your job—a system that will give you the lowest cost per cu. yd. handled.

SAUERMAN BROS. INC.

622 S. 28th AVE. BELLWOOD, ILL.

Crescent Scrapers • Stackline and Tautline Cableways • Durolite Blocks

Equipment You Ought to Know About

Sherman Adds Loaders

Manufacturer: Sherman Products, Inc., Royal Oak, Mich.

Claims: Two hydraulic powered front end loaders, with increased range at maximum and intermediate heights, have been added to the Sherman line. Designed for installation on Fordson major tractors, the loaders are the AJ-20 and the AJ-25.

The AJ-20 has a 2,000 lb. rated lift capacity and 3,500 lb. breakaway capacity. The AJ-25 has 2,500 lb. lift and 4,500 lb. breakaway capacities. Both have a maximum loading height of 10 feet 10 inches. Struck bucket capacity of the AJ-20 is ½ yard; on the AJ-25, ⅝ yard.

Frames of both models are designed to distribute stresses along the entire tractor frame. Location of boom hinge points on both models is designed to give the extra long reach.

The manufacturer lists these other features: Twin double acting cylinders to control bucket tilt; double acting lift cylinders, which provide both lift and down pressure for maximum operating efficiency; a crankshaft-mounted Hydreco gear pump rated at 15 gpm at 1,500 psi powers the AJ-20, while one rated at 21 gpm at 1,500 psi powers the AJ-25; all piston rods are chrome plated; bucket pivot points are located at

rear of buckets; built-in spill guards are on buckets.

Attachments available for the AJ-20 include ½ and ⅞ cubic yard buckets, a six foot bulldozer blade, and an eight foot boom which will lift over 1,500 lbs. to an 18 foot height. Buckets for the AJ-25 are available in ⅛ and ⅞ cubic yard capacities.

Power is provided by a Briggs & Stratton SR6 1.8 hp single cylinder air cooled gasoline engine. Also available is a 1.5 hp gear head electric motor.

The unit, mounted on two 10 x 2.50 rubber tired wheels stands 30 inches, is 28 inches wide and 34 inches long. It is readily adaptable for mounting on tank trucks.

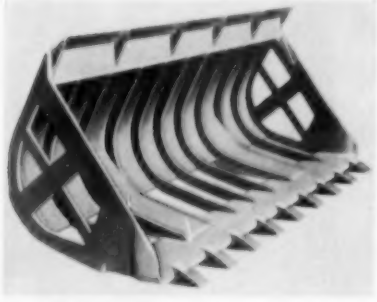
Rock Bucket

Manufacturer: Caterpillar Tractor Co., Peoria, Ill.

Claims: A new two-position skeleton rock bucket is now available for the Caterpillar No. 6 Traxcavator according to an announcement from Caterpillar Tractor Co.

This new attachment is 96 inches wide and has a capacity of 1½ cubic yards struck.

The bucket is for use in handling



clean rock such as in rip-rapping operations on rivers or dams. The skeleton structure provides a grizzly action which eliminates smaller material, leaving only the desired larger sizes of rock.

Like the standard general purpose bucket for the No. 6, the new bucket can be tilted back 11° at the ground level for easier loading and better load retention.

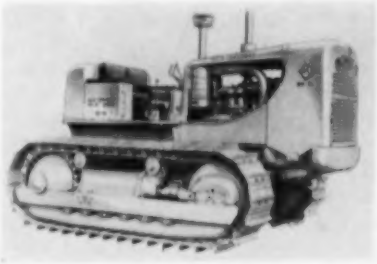
New A-C Crawler

Manufacturer: Allis-Chalmers Manufacturing Co., Tractor Division, Milwaukee 1, Wis.

Claims: The new HD-21 coming off assembly lines at the Springfield plant of Allis-Chalmers Mfg. Co. is designed to meet the changing demands of jobs that require a tractor with more power, longer life and the ability to operate at a lower cost per unit of work. The tractor weighs 44,000 lbs., develops 204 hp at the flywheel and will offer the popular, high-output torque converter drive as standard equipment. Among its many new design features are a new high-capacity cooling system, a new master clutch, new transmission, new Tru-Dimension track, new Wrap-Around radiator guard and the new Allis-Chalmers diesel engine.

The HD-21's new power plant benefits from the latest developments in combustion chamber design. The key explosion in the new engine occurs in a dual-chamber energy cell with the

Continued on page 52



JUST OFF THE ASSEMBLY LINE . . .

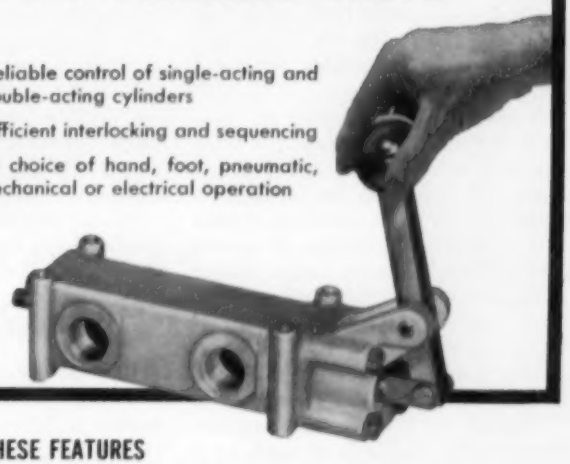
New Flow Valve

WESTINGHOUSE
TYPE D PILOTAIR VALVE

Gives you reliable control of single-acting and double-acting cylinders

Gives you efficient interlocking and sequencing

Gives you a choice of hand, foot, pneumatic, mechanical or electrical operation



YOU'LL LIKE THESE FEATURES

3,125 USES. Every valve is made up from a number of sections that bolt together to give any type of operation.

PRESSURE SEAL STAYS IN THE GROOVE. Completely new Westinghouse seal can't roll out of position . . . will not nick, scar, or chip.

LONG LIFE, LOW MAINTENANCE. No moving metal parts rub against metal. *Valve spool floats on rubber.* Stainless steel spool and aluminum alloy body resist corrosion.

WRITE FOR MORE FACTS

or get in touch with your local Westinghouse Air Brake Co. Distributor. He is listed in the classified phone book under "Cylinders: Air."

Westinghouse Air Brake
COMPANY
Industrial Products Division
WILMERDING PENNSYLVANIA

Pneumatic cylinders, valves, engineered pneumatic systems and air control devices of all kinds.
Factory Branch: Emeryville, Calif. Distributors throughout the United States.
Distributed in Canada by: Canadian Westinghouse Co., Ltd., Hamilton, Ontario.

New Equipment . . .

Continued from page 51

crankshaft well past top dead center. This results in higher sustained working pressures at the most favorable crankshaft angles.

One of the most significant developments in the HD-21 is the high-output performance of the torque converter—engine—transmission team. The HD-21 is said to work with less shifting than ever before possible.

The HD-21 introduces new track developments. In addition to a completely new design and heavier weight, new heat treating methods are used. After track is processed to optimum hardness, track pin bores are electronically annealed to permit machining. This new method is expected to set new standards for track life by producing a high degree of wear-ability with maximum toughness.

The HD-21's outstanding features include a new "Wrap-Around" radiator guard which reduces the cost of tractor-bulldozer combinations by permitting the hydraulic rams or cable-lift sheaves to mount directly on the new guard. For easy service accessibility, the guard tilts forward and down.

A new all-weather cooling system is used on the HD-21, including a large, one-piece radiator which handles coolant water only and has an independent mounting to provide maximum protection from external damage. A separate heat exchanger insures ample cooling of torque converter fluid, and an engine lubricating oil temperature regulator insures proper operating temperature in cold or warm weather.

Many operator benefits are also included on the HD-21, including new foam-rubber-cushion seats and arm rests; hydraulic steering; a wide, clean platform and clear, unobstructed visibility.

Welder

Manufacturer: Hobart Brothers Co., Troy, Ohio.

Claims: A new 300-ampere D.C. selenium rectifier type arc welder with remote control is announced.

The 5-range control switch of this welder provides coarse adjustment with generous overlap between ranges to provide dual control. The rheostat, which can be removed for remote control, provides continuous control by adjusting the direct current through the control coils. These controls provide a wide

welding current range of 35 to 425 amperes for use with a variety of electrode sizes for repair, maintenance and production welding.

A firmly welded core of electrical steel and the absence of moving iron core or adjustable air gaps, assure exceptionally and permanently quiet operation.

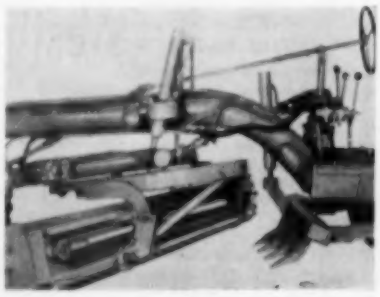
For easy handling by crane or hoist a sturdy lifting eye is provided. It can also be supplied with portable mounting.

Hydraulic Moldboard

Manufacturer: Allis-Chalmers Manufacturing Co., Tractor Division, Milwaukee 1, Wis.

Claims: A hydraulic shiftable moldboard has been introduced by the tractor division as an additional accessory for its Model D motor grader.

The powershift moldboard, similar in design to the hydraulic moldboard of the AD-40 motor grader, permits a side



shift of 16 inches right or left—a total of 32 inches. The blade can be shifted from the operator's seat.

The shiftable moldboard is very desirable when working around guard rails, mail boxes, culverts, buildings, finishing between forms and other similar operations. When used in conjunction with TLD shoulder maintainer, the power shift moldboard speeds shoulder maintenance as it permits work around the various obstructions generally encountered on shoulders.

Vertical-Lift Mack

Manufacturer: Mack Trucks, Inc., New York 1, N. Y.

Claims: The manufacturer has started producing a compact cab-over-engine truck series, with a cab that power lifts vertically from the chassis for easy servicing.

Named the Verti-Lift D series, they are built in truck sizes from 20,000 to 28,000 pounds gross vehicle weight and as tractors in the 40,000 to 53,000 pounds gross combination weight range.

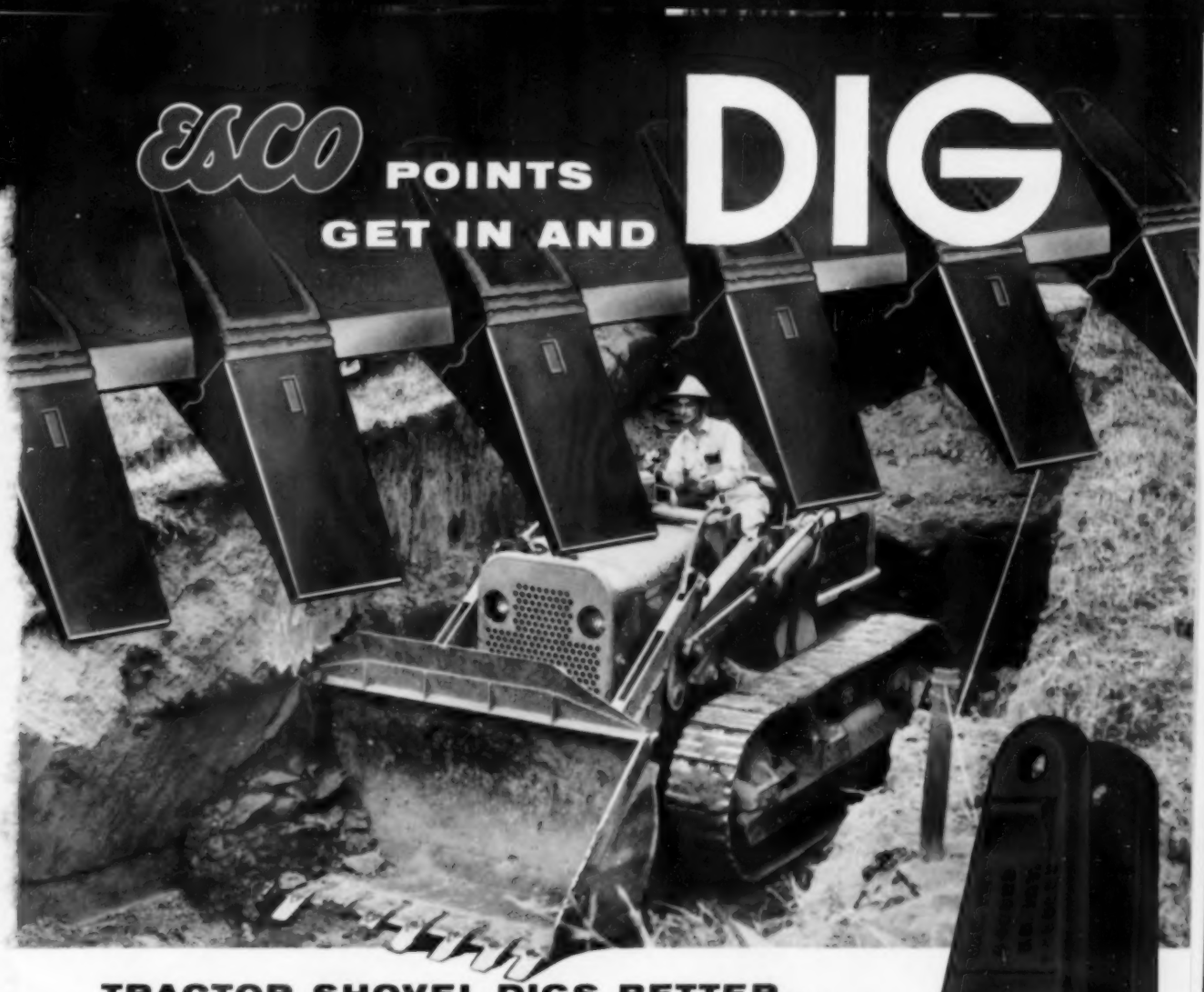
The units are available in four or six-wheel models and in many optional platform lengths.

The compact cab of D models, says Mack, is 12 inches shorter than any cab-over-engine now offered in the industry and up to 50 inches shorter than conventional types. The three-man cab is 6 feet 3 inches wide and 68 inches from front bumper to the back of the cab.

Light chassis weight and design enable distribution of more load on the front axle.

The windshield is large and set at an angle to reduce glare. Seats are positioned for fullest view forward and

Continued on page 55



TRACTOR SHOVEL DIGS BETTER...
BUCKET LIP WEAR IS CUT

...says Excavating Contractor, E. A. LaChapelle, Vancouver, Washington

"Adding *ESCO* Points to my tractor shovel increased loading and digging performance more than 20% — without putting more wear on the shovel," says E. A. LaChapelle, Excavating Contractor, Vancouver, Washington.

"*ESCO* points do a much better job than the solid teeth they replaced. I get real operating economy in all types of hard-to-move material. The points break up the material as they bite into it, so the shovel comes away with a full load every time. The heavy-duty shank on an *ESCO* point adapter just doesn't break off. *ESCO* points make the tractor shovel a good tool for brush clearing, too."

Put more dig in your tractor shovel. Your *ESCO* dealer has points and adapters to fit any standard tractor shovel. See him today, or write for Bulletin 187-A.

...for faster digging at lower cost remember...

ESCO

LECTRIC STEEL FOUNDRY COMPANY

anufacturing
ants
43 N. W. 25th Ave.
rtland 10, Oregon
Porter St.
ville, Illinois

ESCO International—New York Office
at 420 Lexington Ave., New York City, or
Portland Manufacturing Plant

Other Offices and Warehouses
Los Angeles, Calif.
San Francisco, Calif.
Seattle, Spokane, Wash.
Centralia, Pa.
Houston, Texas
Eugene, Ore.
Salt Lake City, Utah
Honolulu, Hawaii

In Canada, Vancouver, British Columbia and Toronto, Ontario

HARD ROCK MAKES THIS BLADE LAST LONGER

Shasta Type End Bit for punching out work on difficult terrain.

on rocky jobs *ESCO* Blades often outwear five or more rolled steel blades

The shock and pounding of rough work develops an extremely hard wear-resistant surface on *ESCO* Blades—because they are *cast* of special *work-hardening* manganese steel. Working an *ESCO* blade actually makes the surface more wear-resistant. Yet, the blade core retains high impact toughness regardless of age or usage—even in sub-zero temperatures. That's why on tough, rocky jobs *ESCO* Cast Blades give far longer life than any rolled steel blade. You get less down-time, lower blade replacement cost—a definite increase in work hours per dollar invested.

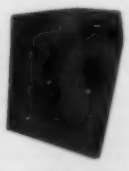
Your *ESCO* Dealer will be happy to give you details.

Excessive end bit wear can be stopped

ESCO End Bits are cast of 12M*, a special alloy steel developed specifically to give maximum shock and wear resistance on rocky jobs, in sand and abrasive material, or in any other dozing condition. Your *ESCO* Dealer has 12M End Bits that will give long trouble-free service on all standard dozers, angle dozers, graders and scrapers.

*Write for the Esco 12M Story

Plain Type End Bit for regular dozer work.



Wrap Around End Bit.

For higher profits and lower cost, insist on...

ESCO

ELECTRIC STEEL FOUNDRY COMPANY

Manufacturing Plants
2141 N. W. 20th Ave. Portland 10, Oregon
712 Ferry St. Danville, Illinois

ESCO International—New York Office at 420 Lexington Ave., New York City, or Portland Manufacturing Plant

Other Offices and Warehouses
Los Angeles, San Francisco, Calif. Seattle, Spokane, Wash. Centralia, Pa. Houston, Texas Eugene, Ore. Salt Lake City, Utah Honolulu, Hawaii

In Canada, Vancouver, British Columbia and Toronto, Ontario

New Equipment . . .

Continued from page 52

downward, and to right and left. Counterweighted door windows can be raised or lowered without use of cranks.

Cabs are insulated, fully ventilated and fume proof. The doors are wide and the steps low.

Access to the engine is had by raising the cab vertically, using a hand pump or by optional hydraulic power. There are no disconnections. The cab automatically locks in raised position. All engine parts can be reached without moving axle and wheels.

Complete removal of the D cab requires less than 30 minutes, claims the manufacturer.

Standard engine in D-20 models is the 290-cubic inch Mack Magnadyne gasoline unit developing 107 brake hp at 2,800 rpm. The D-42 models feature a 150 hp Magnadyne of 401-cubic inch displacement. Both models are offered with a wid- selection of optional components, including five-speed and ten-speed transmissions, single and dual reduction axles and hydraulic or air activated brakes. Six-wheel models are equipped with Mack's balanced bogie and power divider.

Trailer Lighting Unit

Manufacturer: United States Motors Corp., Oshkosh, Wis.

Claims: A complete trailer-mounted lighting unit for the heavy construction industry is offered. A 10 kw U.S. engine generator supplies the power and a series of six 1,500 watt lights with full swivel and vertical adjustment supplies broad illumination for work in strip mining, gravel pits or general construction work.

The panel board allows for individual control of lights and provides receptacle outlets for the operation of power tools. Lights may be removed and "spotted" in a variety of positions and distances around the generator.

A wide variety of engine and generator sizes for lighting and power are available on special order.

P.& G. Truck Tracks

Manufacturer: P. & G. Supply Co., Portland 12, Oregon.

Claims: Truck tracks, designed to fit most tires, are available at equipment dealers or from the manufacturer. The tracks are easy to mount. They quickly

and easily adjust to various size tires and road conditions. The tracks are supplied in the standard size of 15 inches for single and tandem axles. For many larger size tires, heavy duty 18-inch tracks also are available.

Caterpillar New D8

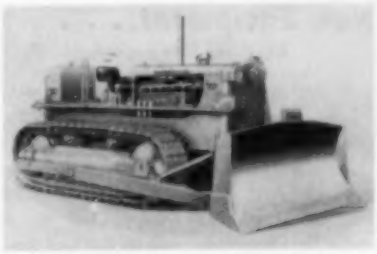
Manufacturer: Caterpillar Tractor Co., Peoria, Ill.

Claims: The manufacturer claims that it has offered a more efficient D8 tractor in two models. One is the torque converter (series D); the other, a direct drive (series E).

Engineering advancements introduced on the D8 make it more powerful, faster and easier to operate and service, says Caterpillar.

Matching attachments have been introduced for the D8, including rear-mounted double dr..n No. 29 cable control and the front, single drum No. 30 cable control. Larger bulldozers with six-part lines for greater lifting power are used. All of the equipment for the former D8 is adaptable for use with the Series D and E units.

With a three-stage 5:1 torque converter, the D8 series D has speeds up to 7.4 mph through a constant mesh transmission which has three speeds forward



and three in reverse. The direct drive has five forward speeds and three in reverse. Speeds range from 1.5 to 5.2 mph with the standard transmission, but optional transmissions will offer job-matched speeds as low as 1.4 mph and as high as 7.2 mph.

With the standard transmission on the series E, the rated drawbar pull is 39,150 pounds and can be increased to 45,020 pounds under proper traction and weight conditions. Optional transmissions will give still higher drawbar pulls. The series D has over 50,000 pounds of drawbar pull. The torque converter drive on the Series D, however, automatically adjusts drawbar pull to the load within the given speed ranges.

The newly designed engine for the D8 has 191 hp at 1,200 rpm, compared to 185 at 1,200 rpm in the model it succeeds. The drawbar horsepower is now 155. One of the important new features of this engine, says Caterpillar, is a "live shaft" drive, independent of the flywheel clutch, which provides constant power for rear-mounted cable controls and steering clutch booster pump drive.

Among other new features are: (1) new fuel injection system with capsule-type injection valves; (2) flanged center main bearing to take crankshaft thrust; (3) timing gear integral with crankshaft; (4) nearly all oil lines and valve push rods located within the engine, simplifying removal of head and giving a cleaner appearance; (5) larger capacity oil manifold to reduce restriction of flow from filter base; (6) new water pump and larger cylinder block water passages to handle greater capacity. The operator can start the tractor from the seat. In line with this, the D8 has a more powerful gasoline starting engine.

The seat has been raised six inches and is located on the left hand portion of the platform. A streamlined hood has been designed. A new instrument panel is connected directly to the engine and is located on the rear panel of the hood.

The entire deck surface of the platform is one plane except for a small foot

Continued on page 56

New Equipment . . .

Continued from page 55

well just in front of the single-man seat.

The front idler yokes have been redesigned to include split arm construction. The track adjustment point has been changed to a location just behind the split-type idler arms. The recoil spring has been increased in size and now provides an assembled load of approximately 38,000 pounds.

Dimensions of the tractor have changed. The D8 now has greater ground clearance—13 inches, compared with 10½ inches in its predecessor. The overall length of the series D is 17 feet 1½ inches and for the series E, 16 feet 3 inches. Both models are 7 feet 5⅛ inches high and 8 feet 7¾ inches wide. The drawbar is 1 foot 6⅞ inches above ground. Operating weights are: series D, 41,265 pounds; series E, 40,430 pounds.

Light Barnes Pump

Manufacturer: Barnes Mfg. Co., Mansfield, Ohio.

Claims: The Barnes' BC-302, recently marketed, is a three-inch diaphragm pump, compact and light weight.

The BC-302 has a handle for portability and a lifting bail for mechanical loading.

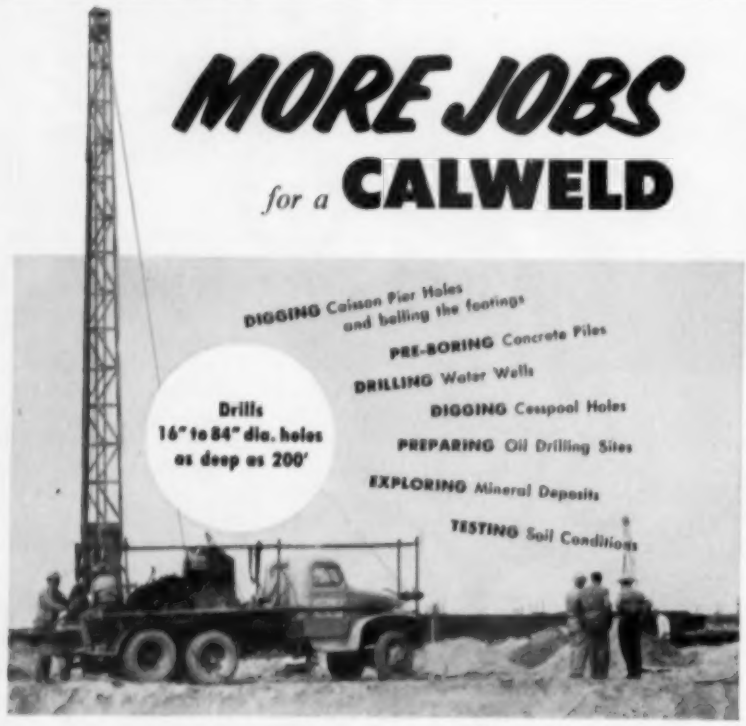
Specifications: Three-inch suction and discharge; capacity of 3,600 gph at 10-feet of head; maximum suction lift and discharge head of 25 feet.

Stronger Yellow Strand

Manufacturer: Broderick & Bascom Rope Co., St. Louis 15, Mo.

Claims: New Yellow Strand "Powersteel" wire rope is 15% stronger than standard Yellow Strand, says the manufacturer. The rope is made of higher carbon wire and drawn to more rigid specifications.

The higher quality rope is designed for jobs requiring more strength.


MORE JOBS
for a CALWELD
DIGGING Caisson Pier Holes and belling the footings
PRE-BORING Concrete Piles
DRILLING Water Wells
DIGGING Cesspool Holes
PREPARING Oil Drilling Sites
EXPLORING Mineral Deposits
TESTING Soil Conditions
Drills 16" to 84" dia. holes as deep as 200'

mean **MORE PROFIT** *for you*

THERE'S ALWAYS WORK for a Calweld Earth Drill because it does so many digging jobs easier, faster and cheaper than by any other digging method. Any two man crew can complete as much as 250 feet of 36 to 48-inch dia. hole in an 8-hour day. The rig is easily moved, easily set up and quickly completes multiple bores without wasting time. Holes are straight and accurate to specification. Calweld removes earth as it digs.

Learn how other contractors are using Calweld Earth Drills for all the jobs listed above; write for a complete set of factual job reports.

CALIFORNIA WELDING & BLACKSMITH SHOP, INC.
7222 EAST SLAUSON AVENUE
LOS ANGELES, CALIFORNIA

CALWELD BUCKET TYPE EARTH DRILLS

Wheel Excavator . . .

Continued from page 31

Bucyrus-Erie 75-B loading shovel of five yard capacity.

Truax-Traer's Fiatt mine was opened in 1935. Right now, there are 250 people employed on the property. The company's processing plant further typifies its attitude towards equipment: Keeping the most efficient units available on the job for lowest costs and keeping them in top shape.

Important people behind the Truax-Traer name include these: A. H. Truax, chairman of the board; Harry Livingston, vice president in charge of operations; R. M. Leseney, mechanical superintendent of the company; Byron Somers, mine superintendent; Gene Long, assistant mine superintendent; Elmer McCann, master mechanic; Floyd Cordray, chief engineer.

As we started out to say, it's true that the overburden isn't getting any shallower. It is equally true that we go right on stripping coal year after year while making the endeavor a paying proposition. To reconcile these two facts we need only look to the American manufacturing genius. This talent produces the high-production machines which make yesterday's impossibly buried coal today's easy coal.

It is not too important that the Bucyrus-Erie wheel excavator has replaced two 10-yard draglines at Fiatt Mine. What is significant is that this machine has revealed new horizons to the strip mining industry.

New Trade Literature

Subject: **I-R Motorpumps**

Content: Ingersoll-Rand's entire line of close-coupled Motorpumps, from ¼ to 75 horsepower sizes for delivery of 5 to 2,800 gpm, is described in a 24 page Motorpump bulletin. Basic classifications of pumps, covered with their specifications, are shown in a visual and concise index. Advantages and design features of the Motorpump are described on three pages. Each class of pump is explained and illustrated in detail in the following pages. Self-priming units and jet pumps also are illustrated. Tables of dimensions, weights, performances and mountings are printed on four pages. A typical pumping problem with its solution and pipe friction tables cover two pages. Request form 7093-E.

Where to get: Ingersoll Rand, Cameron Pump Division, 11 Broadway, New York 4, N. Y.

Subject: **Macwhyte Rope**

Content: Discussed in Macwhyte's *Ropeology* bulletin 554 are a new cable type overhead conveyor system, an automatic safety device for scaffold workers, a test of tires, logging operations, handling steel bar stock, boat slings and well drilling.

Where to get: Advertising department, Macwhyte Co., Kenosha, Wis.

Subject: **Le Roi Engines**

Content: An eight-page, three color bulletin describes the 115 to 410 hp Le Roi L3000, H2000 and F1500 engines. Cutaway views and photographs show advanced features, including modern valve-in-head design. Ask for bulletin E-9. Le Roi also has issued a 12 page catalog, picturing all of its 40 available models of portable type compressors. A quick reference chart easily shows capacities, engine types and mountings available. Many exclusive Airmaster features are illustrated. Short, easily read captions are provided. Ask for bulletin CG-9A.

Where to get: Sales Promotion Dept., Le Roi Division, Westinghouse Air Brake Co., 1706 S. 68th St., Milwaukee 14, Wis.

Subject: **Wellpoint Equipment**

Content: Foundation's complete line of wellpoint pumping equipment is described in this four-page, three-color bulletin. Complete details and specifications are offered on long-life, low-maintenance wellpoint and jetting pumps. Also included is a complete description of Foundation's new Free-flow. Wellpoint, together with information on fittings and adaptors.

Where to get: Foundation Equipment Corp., 38th Ave. and 10th St., Long Island City 1, N. Y.

Subject: **Sherman Diggers, Loaders**

Content: This booklet describes the Sherman power digger and contains illustrations and explanations of its wide range of uses. Also covered are the accessories, work range and specifications of the machine. Sherman also has issued a booklet describing and illustrating two models of the Sherman front end loader for Fordson major diesel tractors. The models are the AJ-25, with a 2,500 lb. capacity, and the AJ-20, with a 2,000 lb. load capacity.

Where to get: Sherman Products, Inc., 3200 W. 14 Mile Road, Royal Oak, Mich., Dept. 000 (diggers) and 520 (loaders).

Subject: **Caterpillar Graders**

Content: *Caterpillar Motor Graders An Investment of Taxpayers' Money* is the title of a booklet published by the Caterpillar Tractor Co. It tells how county commissioners saved on investments of taxpayers' money. Included in the brochure are operating cost figures from county highway departments and several county commissioners' reports on their highway maintenance programs.

Where to get: Caterpillar Tractor Co., Peoria, Ill., or from local Caterpillar dealers.

Subject: **Earth Moving**

Content: *Moving the Earth, The Workbook of Excavation*, is a 1,280 page book, termed by the publisher as the first practical reference work to cover the whole field of earthmoving. The

Continued on page 58

A PRODUCT OF EXPERIENCE!

Omaha Dragline Buckets are the product of more than forty-five years of bucket building experience. They have been field tested and proven on jobs of all kinds. You can't put a better bucket than an Omaha on any job. Write now for catalog giving complete information and specifications for the four types available.
OMAHA
DRAGLINE BUCKETS

DRAKE-WILLIAMS MOUNT • OMAHA, NEBR.

New Literature . . .

Continued from page 57

book includes 1,266 illustrations, 400,000 words of text, a glossary of 1,200 terms and a 43 page index. It has two sections. The first, "The Work," includes chapters on clearing, rough surveying, soil and mud, cellars, ditching and drainage, ponds, landscaping, roads, blasting and tunneling, pits and financial management. The second part, "The Machines," is a detailed discussion of nearly all kinds of earth-moving equipment, covering construction, operation and job application. The functioning of parts, assemblies and engines used in construction equipment is explained in the chapter on basic information. Sideline chapters are devoted to such items as water pumping, deep rotary drilling, pile driving, lubrication and lubrication equipment. Safety is stressed throughout. Although encyclopedic in coverage, the book is non-technical and easy to read and can be used by layman and specialist alike. Author Nichols has had 20 years' experience as an excavation contractor and has operated or supervised the operation of almost all the machines he discusses. He also is author of *How to Operate Excavation Equipment*, published in 1954 as a condensation of *Moving the Earth. Moving the Earth* is priced at $15.

Where to get: North Castle Books, 212 Bedford Rd., Greenwich, Conn.

Subject: **AMSCO Repointers**

Content: This revised guidebook has been released by American Manganese Steel Division as an aid to power shovel users in picking the right repointer style for dipper teeth. Latest developments in repointer design and latest welding rods for attaching or hardfacing the teeth are incorporated in the booklet. Also included is a step-by-step procedure on how to repoint. Sizes of various repointer styles are shown in chart form. Ask for bulletin WA-77.

Where to get: Write Ed Wegerson, American Manganese Steel Division, Chicago Heights, Ill.

Subject: **I-H Blades**

Content: A 24 page catalog describes International hydraulic Bullgrader and Bulldozer blades matched to International T-6, TD-6, TD-9, TD-14A and TD-18A crawlers. The bulldozer blade assembly is solid welded with no pin connections. The Bullgrader blade is connected to the main frame by pins and may be angled horizontally or tilted vertically. Full specifications of the Bullgrader and Bulldozer blades are described in the catalog, along with pictures of them on the job.

Where to get: Consumer Relations Department, International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

Subject: **Portuguese Booklet**

Content: Translated into Portuguese, a 16 page pocket-size booklet prepared by the Bucyrus-Erie Co. outlines the advantages to be derived from individual design in excavators of the ⅜ to 4-cubic yard models in the B-E line. The easy-to-read copy sums up the following advantages: steady high output on digging or loading jobs, faster digging cycles, lower maintenance costs and longer machine life. Field photos of each size machine are included. Ask for booklet S-21-EP.

Where to get: Publicity Department, Bucyrus-Erie Co., South Milwaukee, Wis.

Button your lip! I get tired of you guys telling me how to operate this drill.

New Movies . . .

Subject: **Better Roads**

Content: A 16 mm color sound movie, *Ten Days Per Man*, produced by the Euclid division of General Motors Corp., illustrates the need of public support for better roads programs. The film, which runs 26 minutes, shows how modern methods and equipment can provide more roads at lowest cost. It is designed for showing to civic and service groups, governmental agencies, highway officials and schools and universities, among others.

Where to get: Sales promotion department, Euclid Division of General Motors Corp., Cleveland 17, Ohio, or through Euclid dealers.

PAYLOADER® PROVEN PERFORMANCE means Satisfied Customers

There's one sure way to find out what a machine can do — by using it on your jobs. That's what we mean by proven performance. It's what brings a user back to his Distributor to buy "PAYLOADER" tractor-shovels — again and again. For example, one Distributor reports that over 70% of his 1954 "PAYLOADER" sales was repeat business.

"PAYLOADER" is more than a name for a Hough tractor-shovel — it's a complete line of *proven* models, and complete Distributor parts-service that spells *proven* performance and *satisfied* customers. The Frank G. Hough Co., 708 Sunnyside Avenue, Libertyville, Illinois.

Andrew Catapano Co., one of the largest, most progressive sewer contractors in the New York metropolitan area, has used 2 cu. yd., 4-wheel drive "PAYLOADER" tractor-shovels since 1951—recently bought two more.

The Frank G. Hough Co.
708 Sunnyside Ave., Libertyville, Ill.

Send me literature on the full "PAYLOADER" line and the many available attachments.

Name

Title

Company

Street

City State

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. • LIBERTYVILLE, ILL.
SUBSIDIARY, INTERNATIONAL HARVESTER COMPANY

Kiewit . . .

Continued from page 41

manufactured and driven by Raymond Concrete Pile Co. of New York and Los Angeles. Shortly after the contract became active in the fall of 1954, Raymond moved in with one of their large size crawler-mounted rigs, carrying a 70-ft. set of leads, and their largest size hammer. Driven by steam at 150 pounds per square inch, this big hammer has a 6,500 pound ram which operates through a three-foot stroke to drive the piles.

In the late fall and early winter of 1954, a hammer-core-type rig also was used for a few weeks to speed work on the Rio Hondo River Bridge. At that time the bridge was exposed to water in the river, due to the rainy season, so every effort was made to get the footings up out of the way and the concrete poured.

The Raymond Step Taper pile is exactly what its name implies: a series of corrugated steel shell sections, beginning with a solid-bottom piece and increasing slightly in diameter as each new ten-foot section is added. The shell sections are assembled by a ground crew on a yard mandrel, and the screw-type joints are filled with pitch to make the finished section watertight. Actual driving of the various sections is done by an internal steel driving mandrel, which fits inside the completed steel shell of the Step Taper pile and rests on the driving shoe at the bottom of the section. Energy from the big hammer is transmitted directly from the hammer ram to the driving shoe through this solid steel mandrel. Raymond Concrete Pile Co. has moved along rapidly and they expect to finish work by April 1, 1955.

Huge Imported Dirt Job

In many respects the 1,920,000 cubic yard imported borrow item of the plans represents one of the largest dirt-hauling assignments any contractor has faced in recent years in the Los Angeles area. This was true particularly in consideration of the borrow pit sites, where the necessary material was available. One such site was on state-owned property in hilly country south of Monterey Park, where decomposed granite was present. That site represented approximately a six-mile haul one way to the job. The second site was in the heart of Los Angeles proper, where an open cut is being made to eliminate the 500-ft. Hill Street Tunnel in the vicinity of First and Temple Streets. Not only is that a tricky excavation job, but the one-way haul out to the freeway section under construction is approximately 11 miles.

The Kiewit organization subcontracted the dirt item to Mojave Corp., a southern California trucking outfit specializing in long-range hauling of dirt, drilling mud, and oil field supplies. Mojave Corp. is working both pit sites, while Peter Kiewit Sons' Co. is taking care of fill processing and compaction as the material comes in. At the Monterey Park pit site, the company has approximately ten acres of decomposed granite opened up for excavation by a Sierra Loader. This machine, equipped with a 42-in. disc cutter and a 4-ft. trimming wing, is being pulled by a Caterpillar D8 tractor. Hauling equipment under the Sierra Loader includes eight Mack trucks with dual-bottom dump bodies, built by Cook Bros. of Los Angeles. On a recent clay hauling job at Rogers Lake, where the units didn't have to travel over the highway, they were able to haul 23 cubic yards per load. On the freeway job, however, the trucks must travel over state highways and city streets. Load limitations are so strict that they represent one of Mojave's biggest problems.

The maximum legal payload of one of the big units is 72,800 pounds, for example. That represents approximately 14 bank yards of decomposed granite, or 15 loose cubic yards. The elevating belt of the Sierra Loader, however, travels at 550 feet per minute. Split-second timing is vitally necessary in the loading operation, because dirt moves into the truck at the rate of approximately a ton per second. If the loader operator miscalculates the legal limit by only four seconds, 8,000 pounds of overload can be easily placed in one of the trucks. That represents a $380.00 fine when the truck is weighed by the California State Highway Patrol. To short the load by 8,000 pounds, on the other hand, denies Mojave Corp. the efficient use of its equipment. Excavation by the Sierra Loader, therefore, is an extremely important operation.

The Monterey Park pit is being loosened ahead of the Sierra Loader by a Caterpillar D8 drawn Caterpillar ripper, equipped with three heavy teeth. Work by this machine has been coordinated closely with weather reports, so that when a storm is imminent not too much of the pit is ripped ahead to pick up excess water. That, too, would reduce payload in relation to the material hauled.

One of the job innovations at the Monterey Park pit consists of a method of protecting the 42-in. disc cutter on the Sierra Loader. This is done by using a plow steel liner on the bottom part of the disc circle, and hardfacing the edge with Stoody self-hardening electric rod. The liner plate can be used and hardfaced repeatedly, simply by fastening it to the disc with a countersunk-type bolt. A second liner plate is maintained at the job ready for use, hardfacing and all. It can be installed at a moment's notice when anything goes wrong with the other protective plate.

The Monterey Park pit operation is working a double shift with the help of Kohler light-plant equipment, and

Continued on page 62

STANDS UP TO SEVERE USE

and even abuse

One word describes a Hayward — *ruggedness.* Yes, it's as tough, strong, sturdy as a bucket can be — and even more so. Extreme simplicity, little if any upkeep, high operating efficiency! Details on request. Write! THE HAYWARD COMPANY, 50 Church St., New York 7, N.Y.

HAYWARD BUCKETS

GLAM SHELL • ELECTRIC • ORANGE PEEL • GRAPPLES

famous for performance since 1888

C. J. Langenfelder Co. of Baltimore, Md. is using all types of Euclid equipment to move 4½ million yards on the Northeast Extension of the Pennsylvania Turnpike. Here a "Euc" Scraper with Torqmatic Drive and 29.5 x 25.00 tires gets a heaped load of about 17 bank yds. for a half mile haul to the fill.

Euclid Availability Pays Off
on another tough job for Langenfelder

Men who know their earth moving equipment specify "Eucs" for their tough jobs. They know they can depend on Euclids to move more loads per hour at the lowest cost per ton or yard of material moved.

C. J. Langenfelder Co. is a good example. This well-known contractor has been a "Euc" owner for nearly 20 years and last year bought 52 more Euclids for highway and other earth moving jobs. For a 3-section contract on the Northeastern Extension of the Pennsylvania Turnpike, Langenfelder decided on 3 spreads of "Eucs" to move the bulk of 4½ million yards.

Four Euclid Scrapers of 15.5 yd. struck capacity and two Euclid Twin-Power Scrapers are moving 800,000 yds. on Section G . . . hauls average one-half mile with a maximum adverse grade of 10%. Bottom-Dumps of 13 and 17 yd. struck capacity and a fleet of 15 and 22-ton Rear-Dump "Eucs" are working on the other sections.

Langenfelder is standardizing on Euclids with Torqmatic Drive because of their production performance and low operating cost. In spite of tough working conditions caused by weather and the nature of the job, the Euclids are averaging better than 90% availability. Operating personnel say the "Eucs" are getting more work done than any other equipment they've ever used and maintenance costs per machine are lower than they've experienced on any job of this size.

"Eucs" are an important part of the profit picture for many contractors, large and small. It will pay you to get all the facts on the complete line from your Euclid dealer soon.

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

GM GENERAL MOTORS

"A CARLOAD EVERY 5 MINUTES WITH OUR ERIE STRAYER BUCKET"

REPORTS DEWEY SLOOP . . . SUPERINTENDENT FORREST PLANT, HOLLIDAY SAND & GRAVEL CO.

Five minutes to load a 100,000-pound gondola with sand—less than an hour to fill a 215-ton hopper bucket—that's production! Just 34 seconds per bucket load!

Sand and gravel men must have this swift, efficient production to turn a fair profit. And it's this kind of production the Forrest Plant of the Holliday Sand and Gravel Co. gets day after day with their 1½ yard ERIE rehandler.

ERIE buckets are made for speed. This and the other fine ERIE features cause men like Superintendent Dewey Sloop to volunteer: "The ERIE is the best bucket we've ever had."

Check ERIE's features—then compare prices!

1. **SPEED:** Faster operation from short, powerful closing and opening action.
2. **DURABILITY:** Rigid, one-piece head shrugs off bumps and jars.
3. **LOW HEAD ROOM:** Permits higher stock piling—less frequent repositioning.
4. **LOW MAINTENANCE:** Continuous cable reeving with no reverse-S bends. Less cable to buy.

ERIE BUCKETS THE WORLD OVER

FOR CATALOGS, WRITE DEPT. E55
CABLE ADDRESS: EXIMPORT

ERIE STRAYER CO.

ERIE, PENNSYLVANIA

Kiewit . . .

Continued from page 60

a system of tower-mounted lights, which permits the movement of a steady stream of material out of that location. It should be emphasized, however, that this pit is being used primarily as a secondary source of material to round out that taken from the Hill Street Tunnel operation.

The Hill Street Tunnel excavation operation is another of the interesting phases of this project. The tunnel, built many decades ago, carried automobile and streetcar traffic for many years. Approximately 500 feet long, it was built under a high dirt ridge with a maximum of approximately 60 feet of dirt over the top of the tunnel arch. Since it was vitally necessary because of this compressing load to take the dirt down evenly, specifications limited excavation lifts to ten feet in order to keep the sides of the tunnel equally loaded while dirt moving was in progress. Also, it was necessary to drive wood piles and install timber lagging to stop any clods or rock which might roll down and interfere with the protection of many buildings nearby.

The Hill Street Tunnel excavation is being mucked out by draglines: a Northwest 80-D machine, carrying a 2½-yd. McCaffrey dragline bucket, and a one-yard Northwest machine, carrying a 1-yd. McCaffrey bucket. Machines attending these two pieces of digging equipment include a Caterpillar D8

RENT INTERLOCKING STEEL SHEET **PILING**

"FASTER from FOSTER"

ALL LENGTHS & ALL SECTIONS TO MEET ALL YOUR JOB NEEDS

Foster's lower rental rates on all standard piling sections give you a low fixed expense as an added competitive advantage when bidding on jobs. RENT: Light-weight Corrugated Steel Sheet Piling—Pile Hammers and Extractors.

Send for: Piling Chart EE-5.

L.B. FOSTER CO.

PITTSBURGH 30 • NEW YORK 7 • CHICAGO 4
HOUSTON 2 • LOS ANGELES 5

dozer, which is being used for cleanup work, and a Caterpillar No. 12 motor grader used for the maintenance of haul roads. Hauling equipment around the two units includes 25 large Mack and Sterling trucks with Cook bottom-dump bodies, similar to those used on the Monterey Park pit operation. Bottom-dump gates of these units are operated by compressed air to give quick opening and closing.

The lifts are being made neatly, taking the material down not more than ten feet at a time, so that the tunnel beneath retains a relatively constant load on both sides. The Hill Street operation is scheduled on a double ten-hour basis each day, moving approximately 4,500 cubic yards in that period of time.

Out on the highway, Peter Kiewit Sons' Co. is taking care of necessary leveling, watering, compaction and other processing of the material. Several Caterpillar D8 dozers and Caterpillar No. 12 motor graders are available for leveling the material. There are truck-mounted water tank units. Compaction equipment includes a double set of Southwest sheepsfoot rollers and a full oscillating Southwest 50-75 ton Compactor, pulled by a Caterpillar DW21 prime-mover. This equipment is quite able to handle the material as it comes in. The dirt is being placed in lifts not exceeding eight inches, and the heavy compactive effort put forth by the rollers has developed so far nothing less than 95% of the modified AASHO density.

All in all, the important new section of Ramona Freeway under construction represents ingenious contracting at its best, with excellent cooperation to make it that way from the California Division of Highway engineers. Throughout the job, they have maintained an intelligent and open-minded approach to the new methods. The job will take until early 1956 to complete, including paving, but in that relatively short period, a job almost inconceivable in scope 25 years ago will have been done.

Personnel

The new section of Ramona Freeway is under the general supervision of the California Division of Highways, with George T. McCoy of Sacramento as State Highway Engineer. P. O. Harding, Assistant State Highway Engineer, is in charge of District 7 at Los Angeles, which is supervising the work. William Fahey is District Engineer, Frank Cressy is Construction Engineer, and Basil Frykland is Resident Engineer. Bridge portions of the job are under the general supervision of F. W. Panhorst, Supervising Bridge Engineer: Jim McMahon, Southern Representative of the Bridge Department: George Laird, Construction Engineer; and H. R. Lendecke, Project Representative from the Bridge Department.

T. M. Paul, District Manager, Arcadia, has general area supervision for Peter Kiewit Sons' Co. W. W. White is Project Manager; Brad Lockwood is Project Engineer; Ed Lynch is Structures Superintendent; J. D. Brown is Master Mechanic; and Jim Fuller is Office Manager. According to Project Manager White and District Manager Tom Paul, much credit for the development of the unique auger-boring rig is due to H. A. Franklin, Assistant Superintendent who worked long and hard hours developing the rig from scratch.

Dirt moving operations for Mojave Corp. are under the general supervision of Paul D. Harris, Excavation Superintendent of Monterey Park Pit Site, and Paul De Shaw, Superintendent of the work at Hill Street Tunnel.

Notes from the Manufacturers

Clark Equipment Co., Benton Harbor, Mich., has appointed Charles Dunn Machinery, Inc., 1915 Locust St., Kansas City, Mo., as a distributor for its Michigan line of tractor shovels and excavator cranes in an area of western Missouri and eastern Kansas. Clark has appointed the Mork-Witthauer Equipment Co., 2518 University Ave. S.E., Minneapolis, Minn., to sell and service the Michigan line of excavator-cranes and tractor shovels in southern Minnesota. An appointment to sell and service the Michigan line of excavator cranes was given the Midwest Equipment Co. of Fargo and Bismarck, N. D. The office at 501 N. 4th St., Fargo, will sell in eastern North Dakota and in several Minnesota counties. The Bismarck office, 1400 Main St., will serve western North Dakota and several eastern Montana counties.

Bucyrus-Erie Co., South Milwaukee, Wis., has appointed Edwin T. Goree as assistant sales manager, excavator distributors. He serves under R. C. Adams, who recently became sales manager, excavator distributors, upon the promotion of L. E. MacDonald to general sales manager. Goree joined Bucyrus-Erie in 1947, receiving special training in export sales. He traveled extensively in Mexico, Central America and South America and, in 1951, was named B-E field representative for Mexico. A 1937 graduate of the University of California (B.S., Mining Engineering), Goree served as a mining engineer for Pato Consolidated Gold, Colombia, South America, through 1940 and served as a manager for Pacific Steel and Copper from 1945-47. A native of Calexico, Calif., Goree was an air force major from 1941-45, serving as a pilot and squadron commander. He is married and has four children. Bucyrus-Erie also announced that John H. Plehn has rejoined the company as a sales representative for the company's line of general purpose excavators and drills. He has been assigned to the Seattle office, which is supervised by R. P. Brooks, Northwestern sales manager. A native of South Milwaukee, Plehn formerly was employed by Bucyrus-Erie for 18 years, from 1935 until 1953. He served as a clerk-helper in the steel-foundry and later was shifted to the parts division at the South Milwaukee plant before his transfer in 1945 to the San Francisco (Calif.) parts service station, where he served as a clerk. In 1949 he was appointed a sales representative for tractor equipment in the San Francisco area, a position he held until Dec. 31, 1953, when Bucyrus-Erie terminated tractor equipment sales. Plehn attended Valparaiso university.

Caterpillar Tractor Co., Peoria, Ill., has announced the formation of Caterpillar of Australia Pty. Ltd. The wholly-owned subsidiary, third foreign company formed by Caterpillar since 1950, will manufacture and sell many of Caterpillar's regular prod-

Continued on page 68

This 2½-yd. 54-B dragline is stripping iron ore in an open pit mine near Russellville, Alabama.

A ⅜-yd. 10-B shovel loads gravel into a truck on a road building job in New Mexico.

In Coaldale, Pa., this ½-yd. 15-B dragline loads shale into a crusher.

Here a 22-B dragshovel, ¾-yd. capacity, trenches for a new sewer line in Milwaukee, Wisconsin.

Foundations for a filtration plant on the Hoover Dam near Columbus, Ohio, are poured by a 38-B crane carrying concrete bucket.

A torque converter-equipped 51-B shovel with 2-yd. dipper loads limestone in a Wisconsin quarry.

Newest Bucyrus-Erie excavator is this 3-yd. 71-B, shown on new throughway in Kentucky.

POWER for Profit!

Thousands of Bucyrus-Erie Excavators Help Make a Profit for their Owners on Jobs Like These

Cold, hard experience has taught thousands of excavator owners that Bucyrus-Erie performance is a big step to profitable operations. In construction, mining and quarrying, Bucyrus-Erie excavators are making money for their owners and winning repeat orders.

These men know that Bucyrus-Erie high-speed operation means big output. They know that unique Individual Design insures much lower maintenance costs and far more years of machine life.

Convince yourself. Call your Bucyrus-Erie distributor soon for the facts on excavators from ⅜- to 4-cu. yd. There's real *profit power* in every model.

98E55C

1880 BUCYRUS ERIE 1955

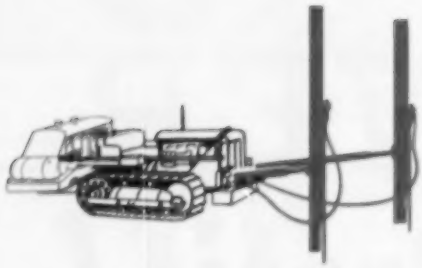
South Milwaukee, Wisconsin

75 YEARS OF SERVICE TO MEN WHO SHAPE THE EARTH

An 88-B crane pours concrete for new high level bridge in Pasadena, California.

22-B Transit Crane digs storm sewer ditch with clamshell bucket in California. Smaller 15-B Transit Crane is also available.

New self-powered Hydrocrane, with ⅜-yd. bucket, excavates basement for new industrial plant in Ohio.



Hydra-Boom

DRILLING RIG

- *increases production*
- *cuts drilling costs*
- *converts setup time to drilling time*

TAKE a truck or tractor. Add a pair of rugged Ingersoll-Rand Hydra-Boom drill mountings with famous X71-WD Drifters and feeds, a Gyro-Flo compressor—Result!—a self-powered, self-propelled drilling rig that will save man hours and cut by far the number of Jackhamers, wagon drills needed on a rock excavation job.

Hydra-Booms lift, swing, extend and retract under smooth, hydraulic power. Drill towers are spotted where you want them at the throw of a valve. Operators spend their time *drilling rock*—not tugging heavy equipment around on rough terrain.

Actual experience on jobs has shown that Ingersoll-Rand Hydra-Boom Drilling Rigs can cut, by 50% or more, the total cost per foot of hole and double production per shift.

Hydra-Booms are big and rugged—They have larger, more powerful hydraulic cylinders to work at lower pressures—piston packings last longer in heavy-duty service. Short, direct piping from the compressor to the drills eliminates friction losses, pipe line and air hose maintenance and air-line breaks due to freezing, blasting or collisions. There is always maximum air pressure at the drills. Also the service-proved efficiency and dependability of the Ingersoll-Rand Gyro-Flo rotary compressor mean long-range savings in air power costs.

For the complete Hydra-Boom story, see your nearest I-R representative or write to Ingersoll-Rand for Bulletin No. 4169.

CARSET JACKBIT

Ingersoll-Rand

5-160 ♥ 11 Broadway, New York 4, N. Y.

ROCK DRILLS • COMPRESSORS • AIR TOOLS • TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • DIESEL & GAS ENGINES

NOT in the Contract

To a tramp who wanted to earn a bite to eat, the farmer's wife said: "If I thought you were honest, I'd let you go into the chicken house and gather eggs."

"Lady," he replied, with offended dignity, "I was manager of a bathhouse for 15 years and I never took a bath."

A man visited an insurance office to have his life insured. The agent asked, "Do you drive?"

"No," said the applicant.

"Do you fly?"

"No," answered the applicant a second time.

"Sorry, sir," said the agent, "but our company no longer insures pedestrians."

An old man from the hill country took his first trip to a large city. Walking into one of the skyscrapers he saw a doorman standing by a special kind of door. An old lady stepped in, a light flashed red and she was gone. A moment later the elevator descended, the door opened and out stepped a beautiful young girl.

"Begorra," said the old man, blinking his eyes, "I should have brought the old woman with me."

Taxpayers: Those who don't have to pass a civil service examination to work for the government.

Shocked old lady: "And on the way here we passed about twenty-five people in parked cars!"

Young hostess: "Oh, I'm sure you are mistaken. It must have been an even number."

"I want you to vaccinate me where it won't show," the beautiful showgirl told the physician.

"All right," the doctor replied, "but that will be ten dollars—in advance."

"Why in advance?" the showgirl asked.

"Because I generally weaken in such cases and fail to charge anything," confessed the doctor.

Two women who hadn't seen each other for a long time met on the street. "Gracious, Jean," said one. "I haven't seen you for seven years. You certainly look a lot older."

"You, too, dear. I wouldn't have recognized you except for the dress and hat."

It was a beautiful night. The moon was full. The scenery was romantic. He held the lovely creature close to his manly chest and whispered in her shell-like ear: "Darling, I love you as no one has ever loved before."

She: "I can't see much difference."

Sir Arthur Conan Doyle was often pestered by people thinking he could solve every crime in dear old England.

A woman at dinner one night annoyed him greatly. "Sir Arthur, do tell me the solution. Mysterious thefts at my home disturb me. Only last week there were taken a broom, a box of golf balls, a left riding boot, a dictionary and six tinplates."

"Madam there is no mystery. You keep a goat."

Typical of a man's genius is the way he develops a bomb designed to drive us into the cellar about the time he starts building homes without any cellars.

A Russian official whispered to his best friend:

"Did I tell you that Iwan Illitsch had a fatal accident?"

"Ha, ha, ha, look over there. There he is right now."

"Psst, he doesn't even know it himself yet."

"I wouldn't say I was bad when I was a kid, but my folks left home when I was six years old!"

Woman: "What's your cat's name, little boy?"

Boy: "Ben Hur."

Woman: "That's a funny name for a cat. How did you happen to pick up such a name for it?"

Boy: "Well, we just called him Ben until he had kittens."

Doctor to contractor: "Why don't you take a long ocean trip of several months duration and leave all your troubles behind?"

Contractor: "But that's desertion isn't it, Doc?"

"Gee, grandpa, what a lot of whiskers you have! Can you spit through 'em?"

"You bet, sonny."

"You better do it now then. They're on fire."

Why don't you be more careful when you tie your shoe laces?

A Two-Way Road

To Added Profits

For contract blast hole work, there's no topping the hard-hitting 20-W and 22-W churn drills for penetration consistent with economy. With direct drive from jackshaft to spudding gear and a shock absorber in the derrick head to provide snap, you get a wallop that puts down 4 to 8-in. holes quickly and easily. All steel welded construction keeps maintenance low, saves on repair costs.

And soon as blast hole jobs ease up, these versatile machines can handle water well jobs, putting added profits in your pocket. Big spooling capacity, fast line speeds, ample tool capacity for their size—all these mean more footage per day, more money for you.

Let one of these dual purpose machines open up a two-way road to added profits for you. For complete information, write today. 29W35

BUCYRUS ERIE

South Milwaukee, Wisconsin

Notes . . .

Continued from page 63

ucts and replacements for the entire line of the parent company. Caterpillar purchased 100 acres of land near Melbourne and will begin construction as soon as possible on a building containing 100,000 square feet. The subsidiary will import Caterpillar machines and parts from the parent company and its other subsidiaries and will buy parts from Australian vendors. Some Caterpillar-designed earthmoving equipment already being made in Australia under license will continue to be manufactured under control of the new subsidiary. Mark A. Clements, manager of the parts department at the Peoria plant since July, 1953, was named managing director of the new subsidiary. J. Robert Hawk, a Caterpillar district representative in Australia since 1953, was named sales manager of the Australia subsidiary.

Colorado Fuel and Iron Corp., New York, N. Y., has announced an improvement program costing "several" million dollars for the Wickwire Spencer Division plant in Buffalo, N. Y. The plant's open hearth furnaces will be increased in capacity from 110 to 170 tons per heat and made efficient; the wire mill will be increased in capacity; new rolling machinery will be installed in the rod mill; turbo blowers will be installed in the two blast furnaces, and a general overhaul is scheduled for the blooming and billet mills. "C. F. & I. is gearing its own growth to the growth of the Buffalo area," said A. F. Franz, firm president. C. F. & I. has 14 plants in seven states. C.F.&I. recently began marketing a new fertilizer, called by the company one of the highest analysis commercial fertilizers known to agriculture.

Cummins Engine Co., Inc., Columbus, Ind., has opened a Piedmont Regional office at Greensboro, N. C., serving Virginia, West Virginia, North Carolina and South Carolina. R. R. MacDonald, former manager of the Cummins Diesel Sales Corp. branch in Milwaukee, Wis., will be in charge of the Greensboro office.

Dart Truck Co., Kansas City, Mo., has appointed the J. P. Waite Co., 3304 W. Pierce St., Milwaukee, Wis., as its representative for Wisconsin and upper Michigan. J. P. Waite will distribute the complete Dart line including off-highway trucks, dirt haulers and crane carriers.

Detroit Diesel Division of General Motors Corp., Detroit, Mich., has a new general manager, Semon E. Knudsen. He succeeds William T. Crowe, who retired after 35 years' service with GM. Knudsen is the son of the late William S. Knudsen, former General Motors president (1937-40). Knudsen had been at GM Allison division since Feb. 1953. He was named manufacturing manager for aircraft engine operations at Allison last December. Knudsen, 42, attended Dartmouth college and was graduated in 1936 from Massachusetts Institute of Technology. He joined GM in 1939 as a process engineer at the Pontiac Motor division, serving successively as chief inspector-defense plant, superintendent of the car assembly plant and assistant general master mechanic. He was appointed director of the process development section of GM in 1949. Crowe had been general manager of Detroit Diesel since its formation in January 1938. He began his GM career in 1920. The Detroit Diesel division also appointed R. L. Burpee to the newly created position of merchandising manager. He formerly was sales promotion manager, which position now will be filled by T. L. Guarniere. Harold J. Vaughn succeeded Guarniere as service training director.

Electric Steel Foundry Co., Danville, Ill., has appointed Roy Weeks as a district representative in the Kansas City (Mo.) territory. Weeks formerly was an ESCO sales engineer in the Portland and western Oregon areas and had 15 years' experience in the logging, construction and power transmission sales fields. Weeks' address is 5219 Juniper Dr., Mission, Kan. He will be concerned principally with service contacts with ESCO construction equipment and logging dealers in the Kansas City area.

General Electric Co., Schenectady, N. Y., has named three new distributors for its welding products. They are: Weld-Arc Sales and Supplies,

Continued on page 70

TO ADVERTISE: All advertising in this section is payable in advance. Rate: $1.00 per line, or $12.00 per inch of 12 lines. Minimum charge $4.00. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

Bucyrus-Erie model 150-B Ward Leonard electric shovel, pushbutton starting, separately driven exciter, Tri-Ten dipper handle, available with six cu. yd. rock dipper or special seven cu. yd. dipper; serial No. 101329; shipped August, 1953; excellent condition; location: South Dakota. Box 3598

Model 95 Northwest dragline-crane combination with 100 ft. boom, 20 ft. jib, live boom, 38" treads, fairlead, tagline, 3 cu. yd. dragline bucket; also there is a new 2½ yd. backhoe attachment for model 95 Northwest. Box 3663

Bucyrus-Erie model 120-B electric shovel, excellent mechanical condition, new in 1949, located in Minnesota, priced to sell. Box 3566

Two Marion 480 electric shovels for power supply three phase 60 cycle 2300 volts located in the South, fair operating condition, also large inventory of unused spare parts, reasonable. For further information, contact: Box 3666

Model 4500 Manitowoc dragline equipped with D386 Caterpillar engine, 120 foot boom, and 6 yard bucket, located in Houston, Texas. Box 3665

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

For sale or will rent at A.G.C. rental rates Bucyrus-Erie 54-B dragline, long and wide caterpillars, maximum 80' boom, Buda 1879 diesel engine, serial #50753; machine in excellent condition. Carveth Construction Co., Lincoln, Nebraska.

Lima model 34 size ¾ cu. yd. Paymaster clamshell machine, serial #896, 35' crane boom, Buda gasoline engine, electric starter, no bucket, reconditioned, excellent buy.

Loader: New Trojan model LC-100-B demonstrated several times; gas engine, torque convertor, 1 yd. bucket; excellent bargain.

Crane and Backhoe: Used Osgood Invader ½ yd. powered by gasoline engine; 40' crane boom; Rudomatic tagline and dragline fairleads. Stuart M. Christhilf & Co., Inc., 134 W. Mt. Royal Ave., Baltimore 1, Md.

Model 54-B dragline serial No. 102641, shipped new in March 1953; equipped with 90' boom, pendant suspension, high A-Frame, light plant, oversize mounting, extra counterweight, powered with NHRS Cummins diesel engine and torque converter; machine in excellent condition and used very little; location Kansas City; will demonstrate. Box 3662

1950 Bucyrus-Erie model 22-T blast hole drill crawler mounted; Hercules gas engine, 35' derrick assorted drill tools; very good condition.

Speeder model 75, ¾ yd. dragline, 45' boom, Chrysler 8 cyl. gas engine overhauled; ¾ yd. bucket; machine in good condition, has new Onan light plant; located in Minneapolis.

Speeder ½ yd. shovel with Buda gas engine, overhauled in good condition; located in Minneapolis.

McKiernan-Terry model 11-B2 double acting pile hammer including 70' leads, with caps for wood, steel and 18" square concrete piling.

Various other ½ and ¾ yd. shovels, draglines, and backhoes in working condition, priced to sell.

Wm. H. Ziegler Co., Inc.
2929 University Ave. S.E.
Minneapolis 14, Minnesota
Duluth—Hibbing—Crookston—Mankato

Lima model 604 shovel, s/n 324164, equipped with 1¼ yd. Amsco bucket, Cummins diesel engine; this shovel was completely rebuilt by us and has since seen about two months service; practically a rebuilt machine; price: $26,000.

Lorain model L-820, 2 cu. yd. shovel w/Waukesha model WAK-6 diesel engine, s/n 18895; this shovel has been completely rebuilt in our shop; price: $35,000. H. O. Penn Machinery Co., Inc., 140th St. & East River, New York 54, New York. Phone: CYpress 2-4800.

P&H model 255A, serial no. 15933 combination shovel, dragline, clamshell, and lifting crane, 45' boom, with ¾ yard dragline bucket, powered with P&H diesel engine, good condition. Machinery & Supplies Co., 2000 Walnut, Kansas City, Missouri.

MISCELLANEOUS EQUIPMENT

General Motors 3-71 diesel engine model 3057-C, serial number 5185571, variable speed governor set at 14000 r.p.m. (for excavator service with machinery idling) and set to deliver 62 h.p. (net) @ 1300 r.p.m. (engine used for short period for light test work). Special reduced price: $2,225, f.o.b. South Milwaukee, Wis. Box 3668

Bucyrus-Erie #12 bit dresser, new, in storage, has never been used, electric driven, 3/60/440 volt for dressing 9" bits, 4¼"-7API pin cap.

Bucyrus-Erie model 29-T churn drill serial no. 12748, complete with 20 H.P. GE motor, 3/60/440 volt; this unit is in good condition with full string of drilling tools for 9" hole; price: $6000 f.o.b. cars Little Rock, Ark.

Bucyrus-Erie model 27-T churn drill serial no. 15502, complete with 15 H.P. GE motor, 3/60/440 volt; complete with full string drilling tools for 6" hole; price: $4000 f.o.b. Little Rock, Ark. Big Rock Stone & Material Co., Little Rock, Ark.

22-B dragshovel attachment ¾ yd. bucket. Williams No. 6 jumbo Hammermill. Electric motor 225 h.p. in perfect condition, Allis-Chalmers. Fred Sievers, 7461 South Lowe Avenue, Chicago 21, Illinois, Phone: RAdcliffe 3-2486.

Six cubic yard dipper and Tri-Ten handle for Bucyrus-Erie 150-B Shovel; slightly used but in excellent condition. Box 3588

FOR 10-B DRAGLINES, CRANES, OR CLAMSHELLS WITH CHANNEL TYPE BOOMS. SPECIAL REDUCED PRICE. F.O.B. ERIE, PA.

10 28' Channel type booms with boom machinery ..... $350 each
15 5' Center boom sections ..... $50 each
Box 3667

New 18" dredging pump, rectangular cross section casing, high alloy steel liners, high alloy cast steel 4 vane runner; spare liners. Box 3587

Complete dragline equipment including 90 ft. boom less bucket purchased for Bucyrus-Erie 100-B, serial No. 23067, unused, price: $5,000. Morrison-Knudsen Company, Boise, Idaho.

POSITION WANTED

Superintendent available. 30 years experience and qualifications covering hi-ways, airports, large sewers, water lines, heavy and light excavating; all types; know cost and modern equipment; sober, honest, and reliable. Box 3595

WASHINGTON, D. C.
20 YEARS EXPERIENCE
selling materials, handling equipment to U. S. Government, Maryland and Virginia. Write JAMES F. HARDY, Barr Bldg., Washington 6, D. C.

If you are Buying or Selling Used Equipment this is the place to let the Excavating Industry know about it.

Notes . . .

Continued from page 68

Inc., 155 E. 44th St., New York City; Interstate Welding Supply Corp., 1067 E. Grand St., Elizabeth, N. J., and T. H. Green Co., 31 N. Water St., Rochester, N. Y. Weld-Arc operates in New York state from Poughkeepsie to New Jersey, including Long Island. Interstate Welding's territory includes northern New Jersey, Staten Island and Manhattan. The upstate New York counties of Livingston, Monroe, Ontario, Wayne and Yates will be served by the T. H. Green Co.

Euclid Division of General Motors Corp., Cleveland, Ohio, has appointed two new dealers for its complete line of earth moving equipment. They are: Evans Engine and Equipment Co., 1230 Westlake North, Seattle, Wash., and General Diesel and Equipment Co., Williston, N. D. Evans Engine will represent Euclid in western Washington and Alaska. General Diesel's territory will be North Dakota and Clay county in Minnesota. Both new dealers are authorized to sell and service General Motors diesel engines in Euclid equipment.

Hensley Equipment Co., San Leandro, Calif., has added the following four dealers: Western Traction Co., Sacramento, Calif.; Pacific Hoist & Derrick Co., Seattle, Wash.; General Machinery Corp., Atlanta, Ga., and Columbia Equipment Ltd., Vancouver, B.C. Hensley manufactures tractor dozer and scraper rippers, cutting edges, bottom track rollers and allied lines.

Leschen Wire Rope Division of the H. K. Porter Co., St. Louis, Mo., has named Fred S. Shumaker district representative of the Michigan sales area, including the lower peninsula and part of the upper peninsula. Shumaker has been selling wire rope to contractors and industrial accounts in the Detroit area for 13 years, part of the time for his own concern.

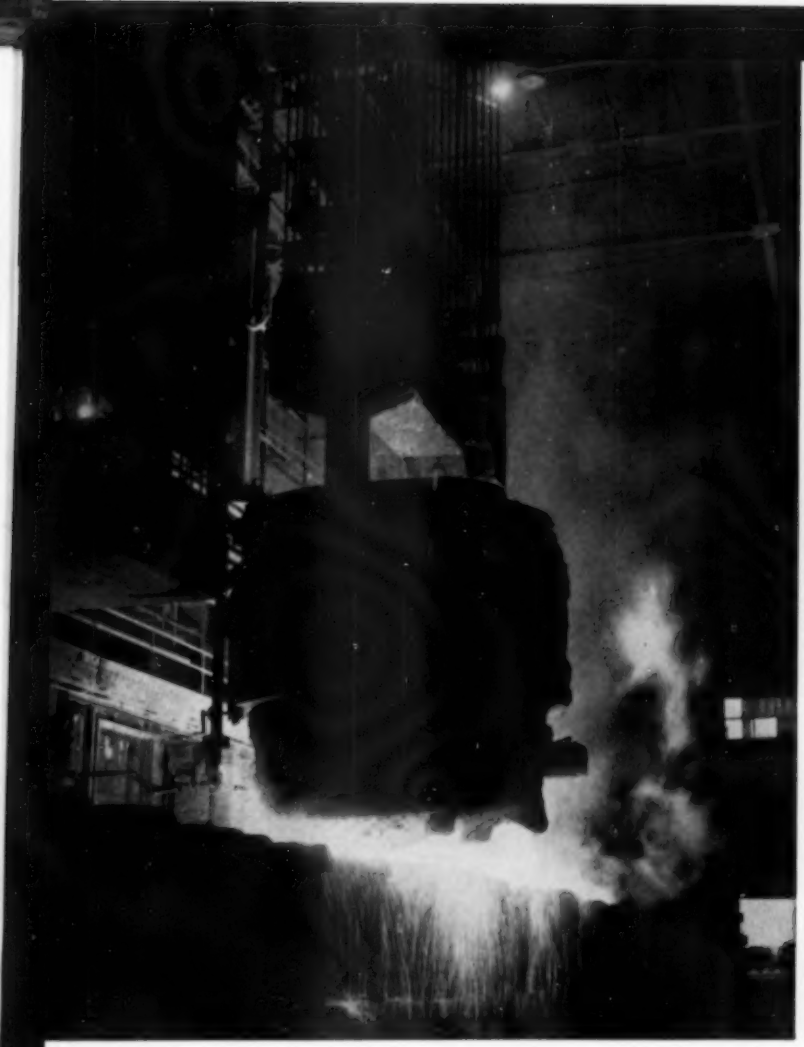
LeTourneau-Westinghouse Co., Peoria, Ill., has announced the appointment of three distributors of its line of high-speed, rubber-tired earth-moving equipment. They are: Columbus Equipment Co., 50 E. Kingston Ave., Columbus, Ohio; O. B. Avery Co., 1325 Macklind Ave., St. Louis, Mo., and the Choate Equipment Co., intersection of highways 30 and 149, Cedar Rapids, Iowa. The Columbus Equipment Co. has been assigned the central Ohio territory. Eastern Missouri and southern Illinois is the territory assigned the Avery Co. Eastern Iowa territory has been assigned the Choate organization. LeTourneau-Westinghouse also has named Steve A. Batorson as district sales representative in an area that includes southern New York, New Jersey, Maryland, Delaware and eastern Pennsylvania. He will work out of Philadelphia. Batorson has been associated with the company for more than 10 years.

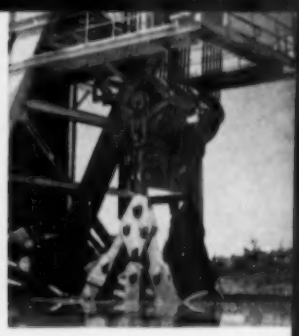
Pioneer Engineering Works, Inc., Minneapolis, Minn., has appointed the Cook Bros. Equipment Co., Los Angeles and Oakland, Calif., as a distributor in California and southeastern Nevada. Pioneer is a subsidiary of Poor & Co., Chicago. Cook Bros. will handle the complete line of Pioneer Continuflo equipment for the mine, pit, quarry, aggregates production and highway construction industries. The Los Angeles office is located at 3334 San Fernando Rd.; the Oakland branch at 416 E. 8th St. Cook Bros. manufactures its own truck equipment.

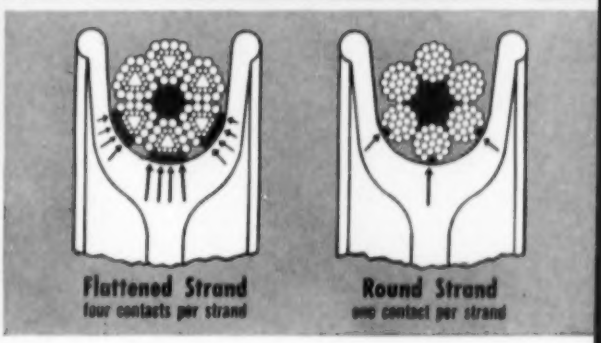
Sherman Products, Inc., Royal Oak, Mich., has appointed John C. Scowcroft as manager of the product research department, sales division. Scowcroft has been at Sherman since 1946, becoming manager of the sales office in 1953. Kenneth Kampman of the sales division succeeded Scowcroft as sales office manager. The product research department is a new branch of Sherman.

Timken Roller Bearing Co., Canton, Ohio, soon will begin construction of a $250,000 rock bit producing facility at its St. Thomas (Ont.) plant. The plant will contain 5,600 square feet of floor space. Production of carbide insert rock bits, in sizes up to three inches in diameter, for the expanding Canadian market and export trade, is expected to begin in September. Forgings for the St. Thomas plant will be supplied by Timken's Wooster (Ohio) steel mill.

Will you mail in that overdue premium on my accident insurance, Mae?







How to handle the tough jobs with Hercules Flattened Strand wire rope

When you think you need a super-rope, check Hercules Flattened Strand. This is the wire rope that packs in 10% more steel than round strand rope, making it 10% stronger and safer. It wears longer and more evenly—reduces sheave wear, too.

The 10% extra strength over round strand rope is sometimes the difference between the possible and the impossible. Hercules Flattened Strand frequently does the tough jobs which would otherwise require larger size rope—and without the bother and expense of changing sheaves and drums. The extra strength is useful, too, when shock loading is involved. Saves rope and money.

If you think that Hercules Flattened Strand wire rope may solve a problem, talk it over first with your Leschen man. He can be reached through your nearby Leschen distributor. His advice is based on the best possible authority—Leschen's long experience and engineering research—the longest in the industry. And with Leschen wire rope you are assured of higher-than-rated quality and longer-than-expected service.

If you can use Hercules Flattened Strand rope you'll be money ahead. See about it soon.

LESCHEN

HERCULES *Red-Strand*® WIRE ROPE

Depend on Leschen's higher-than-rated quality for longer-than-expected service.

LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.
St. Louis 12, Missouri

To lengthen a Trunk Line of Plain or Reinforced Primacord, tie a SQUARE KNOT. *Draw it up as tight as you can — it won't slip back. Caution: don't use any knot in a hole — it might break or hang up explosives when loading.*

PLAN GOOD DIGGING

by using PRIMACORD

As every blaster knows, good digging begins with good planning of the blast.

Primacord is recognized as the safest and most convenient method of firing blasts.

As the detonating agent in each hole it produces continuous priming along the borehole and tends to speed up detonation of the charge — develops more work from the explosives.

As the trunk line, it connects all holes and enables the Blaster to plan the shots for proper sequence, with respect to the open face or the most logical direction of movement of the bank. And, while Primacord detonates at a speed of nearly four miles per second, the infinitely small time delay between holes and rows of holes has been sufficient to relieve burden and produce better fragmentation.

Primacord is light in weight, flexible, strong. It is easily hooked up as shown here. And it's available in Plain, Reinforced, Wire Countered and Plastic Reinforced — each designed to give you the best results under certain conditions of service.

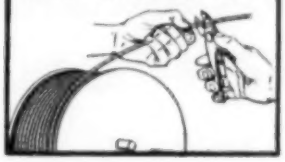
For more information see your Explosives Supplier, or write to

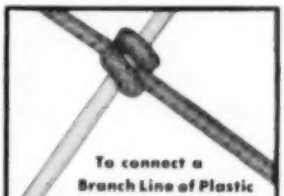
THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONNECTICUT

Primacord — Quarrycord — Ignitacord® — Safety Fuse Blasting Accessories — Established 1836

Cut the Primacord off the Spool Immediately

Make this a safety habit! As soon as you have taken off the length of Primacord you need for a down-hole or for a trunk-line, cut it off the spool! Don't waste a second — do it now!





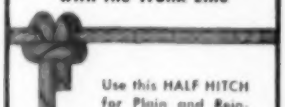
To connect a Branch Line of Plastic Reinforced or Plastic Wire Countered Primacord with the Trunk Line

use this DOUBLE HITCH in the textile-covered Primacord Trunk Line. *Draw it up as tight as you can, and make sure that the Branch Line leads off at a RIGHT ANGLE to the Trunk Line.*

To connect the Detonator with the Primacord Trunk Line

use FRICTION TAPE. You can detonate Primacord with fuse and cap or electric blasting cap. Lay the cap alongside of the Primacord with the business end of the cap pointing in the direction that the Primacord will detonate. Tape the two snugly together, so that you have a tight connection.

To connect a Branch Line with the Trunk Line



Use this HALF HITCH for Plain and Reinforced Primacord. *Draw it up as tight as you can, and be sure the Branch Line leads off at a RIGHT ANGLE to the Trunk Line.*

PRIMACORD®

DETONATING FUSE

PROVED AND APPROVED

P-10